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THESIS

THE IMPACT OF THE SUMMER SEMINAR PROGRAM ON MIDSHIPMAN PERFORMANCE: DOES SUMMER SEMINAR PARTICIPATION INFLUENCE SUCCESS AT THE NAVAL ACADEMY?
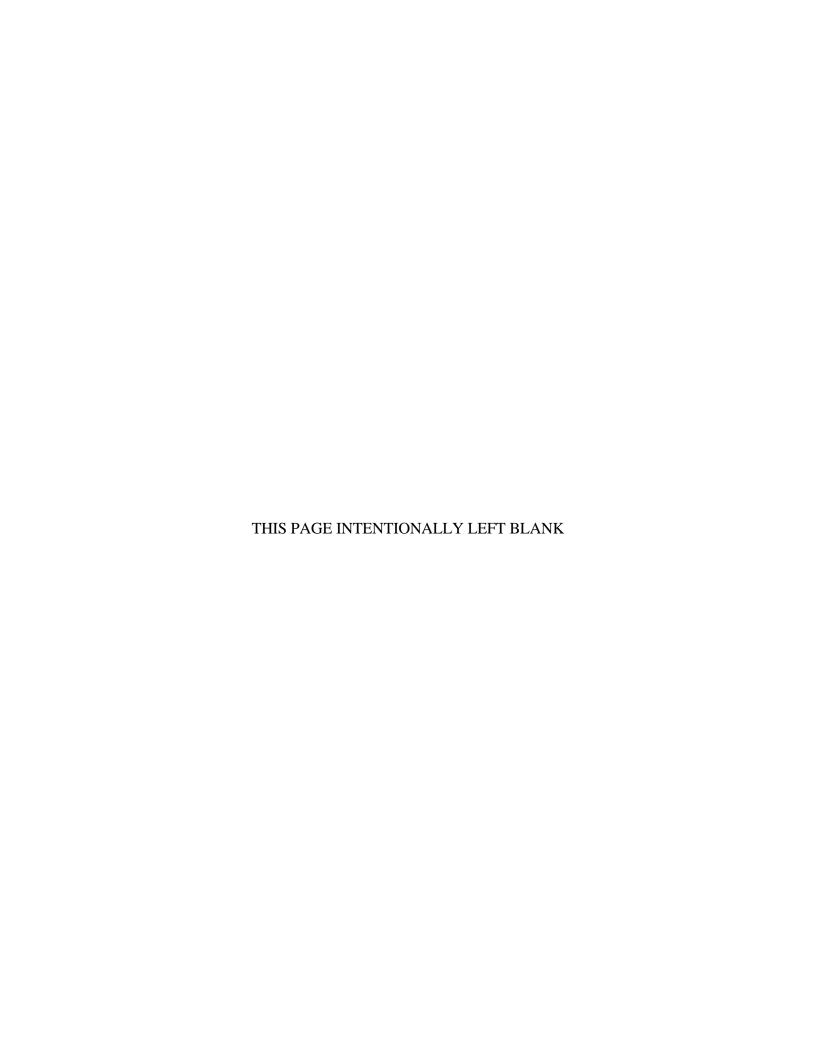
by

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          It is unknown if the Summer Seminar program, which gives rising high school seniors a six-day look at Naval Academy life, has resulted in a more successful midshipman. While not previously discussed in literature, there are an abundance of studies on civilian recruiting and orientation programs, as well as realistic job previews and expectation-lowering procedures. Based on this literature, it is theorized that Summer Seminar program participation will be positively correlated to increased graduation rates and increased academic cumulative quality point ratings, as well as increased military and physical performance. This hypothesis was tested using multiple hierarchical regressions on population data obtained from the Classes of 1997 through 2003. Success is defined using seven dependent variables organized by academic, military, and physical performance. The key independent variable is participation in the Summer Seminar program, while eleven other independent variables control for demographics, selection criteria, and proven indicators of success. Participation in the Summer Seminar program had a significant relation to increased graduation rates, increased academic cumulative quality point ratings, increased military cumulative quality point ratings, and increased physical readiness test scores. This study concludes that the Summer Seminar program makes a unique contribution to midshipman success at the Naval Academy.

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THE IMPACT OF THE SUMMER SEMINAR PROGRAM ON MIDSHIPMAN PERFORMANCE: DOES SUMMER SEMINAR PARTICIPATION INFLUENCE SUCCESS AT THE NAVAL ACADEMY?

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It is unknown if the Summer Seminar program, which gives rising high school seniors a six-day look at Naval Academy life, has resulted in a more successful midshipman. While not previously discussed in literature, there are an abundance of studies on civilian recruiting and orientation programs, as well as realistic job previews and expectation-lowering procedures. Based on this literature, it is theorized that Summer Seminar program participation will be positively correlated to increased graduation rates and increased academic cumulative quality point ratings, as well as increased military and physical performance. This hypothesis was tested using multiple hierarchical regressions on population data obtained from the Classes of 1997 through 2003. Success is defined using seven dependent variables organized by academic, military, and physical performance. The key independent variable is participation in the Summer Seminar program, while eleven other independent variables control for demographics, selection criteria, and proven indicators of success. Participation in the Summer Seminar program had a significant relation to increased graduation rates, increased academic cumulative quality point ratings, increased military cumulative quality point ratings, and increased physical readiness test scores. This study concludes that the Summer Seminar program makes a unique contribution to midshipman success at the Naval Academy.

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I.   INTRODUCTION

A.   BACKGROUND

This research explores whether participation in the Summer Seminar program at the United States Naval Academy (USNA) influences midshipman performance. The Summer Seminar program is an admissions program that gives high school seniors a six-day look at life at the Naval Academy before their last year of high school. The goal of the program is to screen potential applicants to the Naval Academy to ensure that future classes will be comprised of the best midshipmen possible. As well, it gives potential applicants an idea of the environment at the Naval Academy, allowing them to make a more informed decision as to whether or not they should apply for admission.

Although the Office of Admissions at the Naval Academy is aware of the type of person they choose for participation in the Summer Seminar program and the number of candidates chosen for a given class at the Naval Academy who attended Summer Seminar, they do not know if the Summer Seminar program has resulted in a more successful midshipman (Latta, personal communication, June 2003).

Despite the fact that the Summer Seminar program has not been discussed in prior literature, there are an abundance of studies on recruiting and orientation programs in the civilian sector, as well as realistic job previews and expectation-lowering procedures. There is also previous research that exists on the performance of midshipmen at the Naval Academy. While not dealing specifically with the Summer Seminar program, these studies provide a starting point for defining successful performance at the Naval Academy and for predicting Summer Seminar's impact on this performance. Part of the literature review will cover topics from these areas that can be applied to the Summer Seminar program.

The shift from paper to computerized records has made a greater volume of data available for this research than in past studies. The Office of Institutional Research, Planning, and Assessment (IR) at the Naval Academy was able to provide nearly complete data sets for the Classes of 1997 through 2003. Only two dependent variables

in this research were affected by the lack of data available, and these for only one or two class years.

B.   PURPOSE

The purpose of this research is to analyze whether Summer Seminar attendance does give midshipmen a performance advantage during their years at the Naval Academy. The problem is that it is unknown if participation in the Summer Seminar program affects the performance of a midshipman at the Naval Academy.

This study will examine seven aspects of performance, including: (1) graduation rate, (2) academic cumulative quality point rating, (3) major selection, (4) military cumulative quality point rating, (5) striper selection, (6) honor and major conduct offenses, and (7) physical readiness test scores. These seven aspects of performance will be analyzed to determine which, if any, are affected by a midshipman's participation in the Summer Seminar program.

C.   SCOPE AND METHODOLOGY

1.   Scope

The scope of this thesis includes: (1) a review of the literature on recruiting and orientation programs, as well as realistic job previews and expectation-lowering procedures, (2) a review of the Summer Seminar program, and (3) a review of measures of success at the Naval Academy. The data used for this thesis is from actual midshipmen in the Classes of 1997 through 2003 who completed Plebe summer and at least started their first academic semester. It is assumed that midshipmen in these classes who attended the Summer Seminar program did so to orient themselves to life at the Naval Academy in hopes of bettering their chances of admission.

The measures of success used in this thesis are not the only ways in which the performance of a midshipman is measured. Although they are based on the major performance areas as stated in the mission of the Naval Academy, there are many aspects of a successful midshipman that they do not capture.

It is not the intent of this thesis to judge the value of the Summer Seminar program as a whole. The program's effect on the performance of midshipmen, as defined in this thesis, is the only aspect being reviewed. There are many other facets of the

Summer Seminar program, such as the leadership experience provided to the midshipmen who administer it, that may contribute to its value.

2. Methodology

Logistic and linear regression models suitable to the type of dependent variable will be used in analyzing the data. Of the seven dependent variables in this thesis, four are comprised of discrete data and three of continuous data. A logistic regression model will be used for the discrete dependent variables, and for the continuous dependent variables a linear regression model will be used.

The key independent variable in this study is whether or not a midshipman has participated in the Summer Seminar program. In addition, eleven other independent variables are included to control for demographics, admissions criteria, and proven indicators of success at the Naval Academy. These twelve independent variables will be entered into the regression model in four steps, the last of which will be participation in the Summer Seminar program. This will allow for the examination of the unique effect of the Summer Seminar program on midshipman performance.

D. ORGANIZATION OF STUDY

This thesis is organized into five chapters. Chapter II provides a review of the literature on recruiting and orientation programs, as well as realistic job previews and expectation-lowering procedures, to give some insight into what the data may yield in this study. It also provides an overview of the Summer Seminar program and its participants. Additionally, relevant literature and Naval Academy instructions are referenced in order to place some parameters on success at the Naval Academy. To conclude the chapter, hypotheses for this study are advanced.

Chapter III describes the methodology of the study. A description of the data set is presented, followed by an overview of the independent and dependent variables that will be used in this thesis. The chapter concludes by exploring the theory for the data analysis used in this thesis and by reviewing the data analysis techniques to be used.

Chapter IV presents the results of the study. This chapter is broken into sections that focus on the three types of outcome variables examined, including academic,

military, and physical performance. Chapter V provides conclusions on the effect of the Summer Seminar program on midshipman performance.

II.   LITERATURE REVIEW

A.   INTRODUCTION

This chapter is divided into three major sections. The first section reviews the literature on recruiting and orientation programs at businesses and civilian colleges, as well as the literature on realistic job previews and expectation-lowering procedures, to draw empirical support for the hypotheses advanced in this thesis. The next section provides a review of the Summer Seminar program and describes the participants of the program. It also provides a comparison of the characteristics of program participants with midshipmen who have not participated in this program. The third section reviews research on midshipman performance and describes pertinent findings related to the performance measures used in this study. To conclude the chapter, hypotheses are advanced based on the research previously presented.

B.   RECRUITING AND ORIENTATION PROGRAMS

Although academic literature on the Summer Seminar program at the Naval Academy is non-existent, there is no shortage of literature on recruiting and orientation programs in the civilian sector. Various job fields recruit at both the secondary and post-secondary levels of education to attract desirable individuals to meet the needs of that particular field. In academia, civilian colleges wish to recruit the best and brightest high school students to attend their institutions. They accomplish this with a variety of recruiting and orientation programs. Parallels can be drawn between these civilian recruiting methods and the Summer Seminar program.

1.   Job Recruiting

Many sectors of the private work force have targeted students as early as the primary grades of school to expose them to particular lines of work (Bronzini, Mason, Tarris, & Zaki, 2001; Reinstein & Garr, 1995; Rogers, 2001). This is done in hopes of attracting these students to areas where more workers are needed.

One example of this is the civil engineering field. Since the early 1980's, there has been a decreasing number of students expressing interest in civil engineering. Market research from group discussions indicated that the best way to learn what civil engineers do is to expose people to their job. More summer jobs and workshops in civil

engineering were identified as methods to improve the recruitment of high school students (Bronzini et al., 2001).

Accounting is another field that has participated in student recruiting. Facing dwindling interest in their accounting major, the accounting department at Wayne State University (WSU) in Detroit, Michigan began an intensive campaign to bolster interest. This effort was centered on reaching out to students who had not yet enrolled at WSU, and targeted mainly community colleges. Their efforts, which included open houses and career days that exposed the community college students to accounting, resulted in a 20% increase in accounting majors during the first year of the program (Reinstein & Garr, 1995).

The high demand for nurses has necessitated that the health care field compete for the interest of high school students, as well. A week-long summer program was instituted for high school freshmen and sophomores, geared toward recruiting interest in a career in health care career (Rogers, 2001).

These work-place efforts indicate that students who are exposed to a situation beforehand are likely to assimilate more easily into the situation. This knowledge can be correlated to the Summer Seminar program, which offers pre-exposure to the Naval Academy.

2. College Recruiting and Orientation

The labor market is not the only place interested in recruiting high school students. Colleges and universities wish to lure today's talented high school graduates, as well. Exposure to college while still in high school has been shown to be an effective recruiting method. A study of recruitment of students of color by two-year colleges links dual-enrollment programs to recruiting success (Opp, 2001). The study found that college attendance while still in high school was the fourth most significant factor in predicting the success of a two-year college's recruitment of students of color. While the generalization of this data to the Naval Academy is not straight forward, the data in this study suggests that pre-exposure to a college will lead to more successful recruitment. At the Naval Academy, this pre-exposure takes place for some future midshipmen at the Summer Seminar program.

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Virginia Military Institute (VMI) offers pre-exposure to students via a freshmen orientation program. After realizing that students with certain Myers-Briggs Type Indicator (MBTI) scores were more likely to drop out, VMI extended their freshman orientation program to give incoming students a better idea of what the first year at VMI would entail. As a result of this change, attrition is down. Also, grade point averages are up and there are fewer failures in classes among freshmen (Banta & Kuh, 1998).

Some colleges rely solely on a pre-class student orientation programs to prepare new students for college life. These brief orientation programs are often unable to provide realistic preparation for college life. Other civilian colleges have come to realize the value of a more in-depth orientation, and many have begun to offer a freshman seminar class dedicated to making the transition to college a smooth one. Participation in such seminars has led to a greater knowledge of the services available to students as well as increased preparedness and better study skills (Howard & Jones, 2000). For Summer Seminar participants, this could translate into increased academic success at the Naval Academy, among other things.

The University of Notre Dame is an example of a school with successful classes geared towards freshmen orientation. Administrators realized that attrition of first-year students was a problem in colleges and universities nation wide, averaging approximately 25%. In 1962, Notre Dame established a program called First Year of Students. Under this program, students take seminar classes with assigned essays that focus on making the students more familiar with the resources available at Notre Dame. This program is, in part, responsible for 97% of all freshmen returning for a second year. Even after all other factors are taken into consideration, such as the quality of the incoming students, Notre Dame still returns 13% more freshmen than the statistical norm (Schaeffer, 1999).

This literature reviews the recruiting and orientation programs that civilian education institutions have in place to increase the chances of success for their students. These programs, similar to the Summer Seminar program, have been shown to lead to an increased graduation rate and an improved academic performance.

3. Effects Beyond the Naval Academy

There is also evidence that pre-college orientation can be beneficial in the long term. Participants in a first-year student wilderness orientation program conducted during the summer of 1984 at the University of New Hampshire (UNH) were evaluated at various points in the future to assess the effectiveness of the orientation program. The effectiveness of the program was to be measured by reduced attrition and increased academic performance, among other things (Galloway, 2000). In fact, analysis at the one-year and three-and-a-half-year points confirmed the program's effectiveness. One year later, students who had participated in the wilderness orientation program showed significant improvement when compared to non-participants in areas of attrition and academic performance (Gass, 1987). Although not statistically significant at the three and a half year point, analysis of longitudinal design showed that orientation program attendees attrited between 12% and 20% less than non-attendees (Gass, 1990). This part of the study confirmed previous research in the area of orientation programs on students while at college.

In a follow-up study, half of the participants were contacted at the seventeen-year point to ascertain the effects that the orientation program had on them later in life. This follow-up study found that the program's benefits extended well beyond the college years. Using guiding questions in interviews ranging from forty-five to sixty minutes, the author of the original study was able to extract three major themes from the participants. The positive effect of the orientation program on the participant's personal and professional lives, as well as on their undergraduate experience, was one of these themes. Specific benefits sited include direction in their careers and personal lives, as well as the development of personal skills (Gass, Garvey, & Sugerman, 2003).

This research provides evidence that college orientation programs can have some benefit to participants in their careers after college. Since the Naval Academy seeks to prepare midshipmen for a career of naval service, this aspect of orientation programs could surely add to the merits of the Summer Seminar program.

4. Realistic Job Previews and Expectation-Lowering Procedures

Another group of literature with relevance to the Summer Seminar program includes research on realistic job previews (RJPs) and expectation-lowering procedures

(ELPs). Realistic job previews are methods that give job applicants a balanced presentation of the job that they are applying for. This presentation includes both favorable and unfavorable information about the job, rather than just the positive information included in a typical job preview. A realistic job preview is usually presented via personal presentation, video, or written pamphlet (Roth & Roth, 1995). Realistic job previews differ from orientation programs in that they are always presented to the potential employee before the job is taken, they make the potential employee think hard about applying for the job rather than trying to convince them to apply, and they are more narrow in scope than an orientation program (Wanous & Reichers, 2000).

Realistic job previews have been shown to have positive outcomes. In a meta-analysis of 40 studies, 26 of which were published, realistic job previews were found to be related to increased performance, lower attrition from the recruitment process, lower initial expectations, lower voluntary turnover, and lower overall turnover (Phillips, 1998). There are, however, some studies that isolate the effects of realistic job previews. A true field experiment on the service commitment of soldiers in the Israeli Defense Force (IDF) (Ganzach, Pazy, Ohayun, & Braynin, 2000) revealed that the effects of realistic job previews in this setting faded over time. Realistic job previews were significantly related to pre-entry commitment, but were not related to job commitment one year later. In another field experiment with correctional officers (Meglino, Denisi, & Ravlin, 1993), realistic job previews were found to be significant only after the correctional officers remained on the job past the probationary period.

To further understand these varying results, it is important to understand how a realistic job preview acts on the potential employee. By allowing an applicant to make a more informed choice about a job, potential employees are believed to be self-selected out of a job that would have been a poor match for them. Realistic job previews also claim to foster in the applicant a sense of trust for the institution, as well as a feeling of being cared for, due to the frankness of the information presented. Finally, they are believed to reduce role ambiguity and strengthen an applicants commitment to the organization, as well are reduce overly positive expectations concerning the job (Meglino et al., 1993). A study of 82 newly hired nurses (Hom, Griffeth, Palich, & Bracker, 1998) found that met expectations were the main reason that realistic job previews provided

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favorable outcomes. After some scrutiny, these conclusions were retracted and replaced with results proposing that coping strategies and perceived employer concern are the key enablers of realistic job previews (Hom, Griffeth, Palich, & Bracker, 1999).

Due to the ambiguity in the observed outcomes of realistic job previews, some studies have looked at other variables in concert with realistic job previews in an attempt to explain the varied success. One of the other areas studied has been expectation-lowering procedures. As explained above, realistic job previews are believed to lower a potential employee's expectations for a job due to the realistic information provided. ELPs differ from RJPs in that they do not focus on a specific job procedure. Rather, they provide a more general, realistic overview of a potential employee's situation (Buckley, Mobbs, Mendoza, Novicevic, Carraher, & Beu, 2002). Buckley et al. (2002) found that both realistic job previews and expectation-lowering procedures were significant in reducing an employee's expectations. However, only expectation-lowering procedures were significantly related to retention.

The research on realistic job previews and expectation-lowering procedures suggests that both of these techniques may influence retention. In addition, research shows that realistic job previews have been related to increased employee performance. As explained in the next section, the Summer Seminar program clearly provides potential applicants to the Naval Academy with a realistic preview of what life as a midshipman is like. It is likely that the literature on realistic job previews and expectation-lowering procedures can be generalized to the Summer Seminar program.

C. THE SUMMER SEMINAR PROGRAM

1. The Summer Seminar Program Defined

Past research indicates that civilian college recruiting and orientation programs have provided a more academically successful student. Research also shows that realistic job previews and expectation-lowering procedures can lead to increased performance and retention. The Naval Academy Summer Seminar program is similar to these programs and thus may yield similar effects on midshipman performance. The Summer Seminar program is a six-day program that is designed to give rising high school seniors an introduction to life at the Naval Academy. For three consecutive weeks in June, 600 young men and women per week experience an insider's look at the Naval Academy.

The program is administered mainly by First and Third Class Midshipmen, and it is these 136 midshipmen who are charged with leading the high school seniors through their experience.

Mr. Don Nelson, Assistant Direction of Admissions and the director of the Summer Seminar program, states that the mission of the program (Nelson, 2003) is

> to introduce high school students to the total Naval Academy experience,
> and specifically, the opportunities that a Naval Academy education can provide.
> (p. 12)

Although the program has been around for over twenty years under the Office of Admissions, Mr. Nelson is credited with expanding the program significantly over the past decade (Nelson, 2003).

In fact, the data supports the above credit given to Mr. Nelson. Table 1 shows that the Class of 1997 had 128 members who attended the Summer Seminar program, a majority of them during the summer of 1992. Six years later, the Class of 2003 had 366 members attend the program, a 186% increase. More recent classes have seen a similar number of participants as the Class of 2003, bringing the percentage of Summer Seminar participants in incoming classes from under 11% to just over 30% in just a decade. Clearly, the Office of Admissions sees this program as important.

Table 1.   Summer Seminar Participation by Class Year

CLASS	1997	1998	1999	2000	2001	2002	2003
PARTICIPANTS	128	157	213	259	345	391	366
TOTAL CASES	1181	1208	1155	1209	1174	1226	1218

Participants can expect to be fully integrated into life at the Naval Academy during the six-day session. They live in Bancroft Hall, the Brigade dormitory, eat in King Hall, the Brigade mess hall, and participate in academic and leadership workshops. Each participant attends eight, 90-minute workshops with a primarily academic focus. Topics for these workshops range from naval architecture, aerospace flight-testing, and

ocean engineering to literature, economics, and sailing (United States Naval Academy, 2003a).

Each day of the Summer Seminar program begins at 0545 with physical training that lasts 45 minutes. After breakfast, participants take part in workshops, followed by lunch and more workshops. At 1600, they are given an introduction to military drill or intramurals at the Naval Academy. After evening meal, special events such as the United States Marine Corps Sunset Parade or career presentations by Navy and Marine Corps officers occur. Participants are even given a brief, mock Plebe indoctrination session. Finally, there is taps at 2300 (United States Naval Academy, 2003b).

2.   Summer Seminar Program Participants

The Summer Seminar Program is highly competitive because of the limited number of spots available each summer. In order to apply, applicants must be United States Citizens who will have completed their junior year of high school just before the summer they wish to attend Summer Seminar. They must not be married, pregnant, nor have any legal obligation to support a child or other person. Superior high school performance is a must, with a GPA above 3.5, a rank in the top 20% of their high school class, and/or strong PSAT/SAT/ACT results. Participation in athletics and extra-curricular activities is also considered, as is good physical fitness, including vision correctable to 20/20 (United States Naval Academy, 2003c).

All applicants to the Summer Seminar program will automatically be processed as applicants to the Naval Academy the following year. Due to the small number of available Summer Seminar spots each summer, students who are not accepted to the Summer Seminar program are highly encouraged to continue pursuing admission to the Naval Academy (United States Naval Academy, 2003d). Table 2 presents the demographic characteristics of program participants and non-participants for the Classes of 1997 through 2003. Of note, a larger relative percentage of females access via the Summer Seminar program. As well, Summer Seminar program participants have, on average, higher scores on all admissions criteria, with the exception of the Strong Campbell Interest Inventory (SCII) Technical Interest Score (TIS) and SCII Career Interest Score (CIS). Both groups have close to the same average for TIS and CIS scores. The relatively low percentage of preparatory school attendees and prior-enlisted members

who are Summer Seminar participants is expected, as this is not the normal accession route for these categories of applicants. The percentage of minorities accessed is roughly the same for each group. See Chapter III for a more in-depth description of all variables presented in Table 2.

Table 2.   Scores on Independent Variables for the Classes of 1997 through 2003

VARIABLE	SUMMER SEMINAR PARTICIPANTS	NON PARTICIPANTS
Minority Percentage	18% (n=331)	19% (n=1236)
Female Percentage	21% (n=387)	15% (n=967)
Average Extracurricular Activity Score	562 (n=1859)	552 (n=6511)
Average High School Rank Score	593 (n=1859)	561 (n=6512)
Average Teacher Recommendation Score	886 (n=1859)	876 (n=6512)
Average SAT Math Score	681 (n=1859)	653 (n=6512)
Average SAT Verbal Score	662 (n=1859)	626 (n=6512)
Average SCII Technical Interest Score	492 (n=1859)	495 (n=6511)
Average SCII Career Interest Score	498 (n=1859)	494 (n=6511)
Preparatory School Attendance Percentage	9% (n=170)	25% (n=1644)
Prior Enlisted Percentage	1% (n=22)	16% (n=1021)

D.   SUCCESS AT THE NAVAL ACADEMY
1.   What to Measure

The Summer Seminar program uses valuable resources at the Naval Academy in hopes of discerning a more qualified candidate. Some of these resources include money, physical space on the Yard, and most importantly the time of midshipmen and officers. To justify the use of such resources, the effectiveness of the program must be evaluated.

The research on measuring the effectiveness of military training is plentiful (Kirkpatrick, 1983; Salas, Milham, & Bowers, 2003; Simpson & Oser, 2003). One study on training evaluations in the military points out that evaluations are rarely done (Salas et al., 2003). Numerous reasons are sited, the first being that it is impossible in the military environment given that a purposely un-trained control group is a rarity. The check-in-the-box mentality of military training is also considered, where training is measured using pass or fail standards rather than levels of effectiveness. Third, evaluations are often not needed in the minds of military trainers on the grounds that training is known to be effective and that technology has produced real-life simulators on which to train. The problem is that these trainers provide practice but rarely measure performance (Salas et al., 2003).

The authors argue that training evaluation is necessary, and state that the "right things" must be measured. A list of five outcomes that can be measured to quantify training effectiveness is proposed. They are reaction outcomes, learning outcomes, cognitive outcomes, behavioral outcomes, and organizational outcomes. Reaction outcomes are reported by trainees and measure how well the training was liked. Learning outcomes are a measure of how well information was captured by the trainees. Cognitive outcomes deal with the amount of knowledge gained and the relationship between individual pieces of knowledge. Behavioral outcomes deal with how well the trainee can perform a task in the training environment, as well as how that performance transfers to an organizational setting. Organizational outcomes measure changes in an organization that are attributed to training receive by its members (Salas et al., 2003).

An earlier study on the measures of training effectiveness proposed a four-stage system of measures (Kirkpatrick, 1983). This study served as a basis for the outcome-centered approach mentioned above, and it also provided specific ways of measuring each stage.

The four stages are reaction, learning, behavior, and results. Trainee reactions can be measured by soliciting written comments on a pre-designed form. Learning, in this study not only the knowledge learned but also any changed attitudes, can be measured using pre-post tests or surveys. With regards to measuring the behavior change in

trainees, the true test would come from on-the-job observations from supervisors, peers, and subordinates. Results would be the hardest to measure, since there are so many factors affecting the performance of a trainee that it would be nearly impossible to attribute any positive results directly to the training program (Kirkpatrick, 1983).

Simpson & Oser (2003) suggest that

measures are not all of equal importance. Reaction data are useful but less important that learning, which is less important that results in the simulator. None of these are as important as performance in the real world, which means that post-training measures are the most important of all. (p. 33)

This study makes it clear that, although performance in training may be measured, it is performance in the real world that counts (Simpson & Oser, 2003).

When considering the effectiveness of the Summer Seminar program, measures that deal only with performance of attendees at the program itself could be considered. However, this would produce a limited view of success that would only be of use to the Summer Seminar program. In reality, the program is there to help the Office of Admissions identify the highest quality candidates so they may be admitted to the Naval Academy. In this view, the Naval Academy is the "real world," and it is at the Naval Academy where success must be measured.

2. Measures of Success

The mission of the Naval Academy (United States Naval Academy, 2002) is

to develop midshipmen morally, mentally, and physically, and to imbue them with the highest ideals of duty, honor, and loyalty, in order to provide graduates who are dedicated to a career of naval service and have potential for future development in mind and character to assume the highest responsibilities of command, citizenship, and government. (p. 14)

Since the mission of the Naval Academy is to develop midshipmen "morally, mentally, and physically," there is no one single variable that captures a midshipman's performance.

The Naval Academy's strategic plan also contains some guidance on the ideal graduate. The overview for the strategic plan lists nine statements about what a graduate should be. Three of them are: 1) role models of ethical behavior and moral conduct, 2) exemplars of academic, technical and tactical competence, and 3) individuals with a passion and commitment to lifelong learning and physical fitness (United States Naval

Academy, 2003e). These goals reinforce and expand upon the mission of the Naval Academy.

Another source of guidance for the desired performance of midshipmen is from Naval Academy and Commandant of Midshipmen instructions. Minimum standards for graduation are promulgated, including a minimum academic cumulative quality point rating of 2.0, as well as meeting the standards in military, honor, conduct, and physical performance (United States Naval Academy, 1994). Guidance is also given in an instruction on aptitude for commissioning. In order to graduate, midshipmen must receive a satisfactory grade in aptitude. Two of the items listed to consider when grading a midshipman in aptitude for commissioning are: 1) the collateral effect of physical readiness test scores and conduct grades, and 2) striper/leadership roles in the company (Allen, 2003).

The mission of the Naval Academy, the strategic plan, and the guidance given in instructions all point to three general areas of performance for midshipmen at the Naval Academy. The first is academic, the second is military, and the third is physical. Performance in these three general areas will be analyzed to determine a midshipman's success at the Naval Academy.

A study of prior enlisted performance at the Naval Academy (Mishoe, 2000) used dependant variables that defined academic and military success at the Naval Academy, including graduation rate and selection as a striper, respectively. These two variables are used in this study, although the definition of a striper is changed slightly. Striper is the nickname for leadership positions given to midshipmen in their first-class, and sometimes second-class, year to enhance leadership opportunities. There are two different sets of stripers each year in an attempt to give as many midshipmen as possible leadership opportunities (Bogle, 1996).

That same study of prior enlisted performance also focused on the overall order of merit (OOM), academic OOM (AOOM), and military OOM (MOOM) as measures of overall, academic, and military success, respectively. The OOM summarizes all performance at the Naval Academy, and is used to determine class standing. Table 3 lists

what the OOM is composed of, as well as the weight given to each individual component (Larson, 1996).

Table 3.   Components of Order of Merit

COMPONENT	WEIGHT(%)
Academic and Professional Courses	64
Physical Education	7
Athletic Performance	3
Military Performance	18
Conduct	8

OOM is ordinal data that does not lend itself well to the analysis techniques used in this study. Also, OOM encompasses many individual aspects of performance that will be looked at separately in this study. For these two reasons OOM will not be used, but it is included here to illustrate the importance of academic and professional courses. This will be discussed in the following paragraphs.

The AOOM and MOOM look independently at academic performance and military performance, respectively. Like OOM, they are ordinal variables that do not lend themselves well to the analyses used in this study, but they are excellent indicators of success for midshipmen.   So that they may be used in this thesis, the data that AOOM and MOOM are derived from will be analyzed. Academic cumulative quality point rating (Academic CQPR) and military cumulative quality point rating (Military CQPR) will be used instead of the AOOM and MOOM.

The Academic CQPR is what midshipmen are ranked by to give them their AOOM. A midshipman's Academic CQPR includes grades from both academic and professional classes and takes into account the number of semester hours taken by the midshipman (Larson, 1996). The Academic CQPR, as well as being the raw data that the

AOOM is based upon, is also a ratio variable. For both of these reasons, the Academic CQPR will be used as a measure of academic success.

Similarly, the Military CQPR is what midshipmen are ranked by to give them their MOOM. The Military CQPR covers all of the other measures of performance used in calculating the OOM that were not covered by the Academic CQPR. The components of the Military CQPR, as well as their weights, are listed in Table 4 (Larson, 1996). For reasons similar to the Academic CQPR, the Military CQPR will be used as a measure of military success.

Table 4.   Components of Military Cumulative Quality Point Rating

COMPONENT	WEIGHT(%)
Physical Education	17
Athletic Performance	8
Military Performance	45
Conduct	20
Professional Courses	10

Two other dependent variables are needed to encompass the moral and physical aspects of the Naval Academy's mission. Morally, a midshipman's honor and conduct performance can be considered. The honor concept was developed by midshipmen in 1951 to enable self-regulation of high ethical standards. This honor concept applies to midshipmen at all times, including while on liberty or leave. Their statements and actions must always represent the complete truth. Options available to a midshipman who witnesses an act in violation of the honor concept include personally confronting and, if necessary, counseling the individual or turning in the individual to the honor board for formal consideration (Ryan, 2001).

The conduct system at the Naval Academy holds midshipmen to a high standard of personal behavior, both on and off duty. Violation of the conduct system results in

demerits, as well as various forms of punishment including restriction, loss of leave and privileges, and marching tours. Conduct offenses are broken up into two categories, minor and major. Minor offenses may be used as a tool to train the First Class Midshipmen in how to administer a non-judicial punishment system. Officers always adjudicate major offenses, as a midshipman may be separated for committing a major offense. A particular act may not be charged under both the conduct and the honor system (Locklear, 2000a).

A study of the success of varsity athletes at the Naval Academy attempted to use honor violations and conduct grades as two variables to measure moral success (Harvey, 2003). The lack of variance in these two variables prevented them from being successful predictors. In this study, these two variables will be combined into one in an attempt to gain a useful measure of the moral success of midshipmen. However, instead of using conduct grades, whether or not a midshipman committed a major conduct offense will be used to determine good conduct.

Physical performance is the third area considered. The physical education curriculum at the Naval Academy is designed to provide graduates with a solid foundation of physical readiness to include water survival, physical development, personal conditioning, and recreational sports. Specific classes to accomplish these goals include personal conditioning, swimming, boxing, wrestling, judo, and a variety of recreational sports that may be taken as electives (Locklear, 2001). The physical readiness test (PRT) is a comprehensive measure of a midshipman's physical readiness. Height and weight measurements are used to assess body composition. As well, cardio fitness, endurance, muscular strength, and flexibility are measured using a run or swim, sit-ups, push-ups, and a sit-and-reach, respectively. Midshipmen are charged with maintaining a personal physical fitness program to keep them prepared for the PRT, which is graded twice a year while at the Naval Academy (Locklear, 2000b).

A midshipman's physical success will be measured using data just recently available from IR at the Naval Academy. Physical performance will be judged by the average of their spring PRT scores while at the Naval Academy.

A final dependent variable, looking at the academic major selected by each midshipman, will be examined. Although the selection of a specific academic major is not usually considered in defining success at the Naval Academy, it has been linked to retention in the fleet (Gottschalk, personal communication, July 2003). Since part of the Naval Academy's mission is to provide graduates dedicated to a career of naval service, this seventh measure of success will be included.

3. Past Studies of Success

There are some factors that have been shown to influence success at the Naval Academy. Prior-enlisted military service is one of these, and it has been shown to positively affect success (Mishoe, 2000). This study focused on midshipmen in the Classes of 1990 through 1999 who had previously served in fleet units before attending the Naval Academy. Despite the small percentage of prior-enlisted midshipmen as defined by the study, linear and LOGIT regression models demonstrated prior-enlisted military service to be positively correlated with striper selection, overall order of merit, academic order of merit, military order of merit, and graduation rate.

Attendance at a preparatory school has also been looked at as a predictor of success at the Naval Academy (FitzPatrick, 2001). In this study of the Classes of 1990 through 2000, the Naval Academy Preparatory School (NAPS), the Broadened Opportunities for Officer Selection and Training (BOOST) program, and the Naval Academy Foundation Scholarship (Foundation) were all examined for their roles in the success of midshipmen. Although few significant differences were discovered, OLS regression analysis and LOGIT regression models showed that preparatory school students performed as well, and in some cases better, than midshipmen who accessed straight from high school in the areas of academic cumulative quality point rating, military cumulative quality point rating, and graduation rate. Preparatory school attendance was negatively correlated to overall order of merit.

Prior-enlisted military service and preparatory school attendance have been shown to affect various facets of success at the Naval Academy, both positively and negatively. These factors will be controlled for in the analyses in this research.

4. Gaining Admission

Before a midshipman can succeed at the Naval Academy, they must be offered and accept an appointment to the Naval Academy. Although approximately 40% of all Summer Seminar participants ultimately attend the Naval Academy (Nelson, 2003), it is not a prerequisite. The Office of Admissions primarily uses seven variables when comparing candidates for admissions purposes (Goss, Watson, Culler, & Zettler, 1999). These variables, and their associated weights for the Class of 2003, are depicted in Table 5.

Table 5.   Candidate Multiple Variable Weights for the Class of 2003

VARIABLE	WEIGHT(%)
High School Class Rank	19
Teacher Recommendations	8
Extracurricular Activities	10
SAT(or ACT) Math	34
SAT(or ACT) Verbal	11
SCII Technical Interest Score	9
SCII Career Interest Score	9

These admissions variables will be controlled for because midshipmen are admitted based on their success in these variables. The higher the weight of the admissions variable, the more positively it should be correlated with favorable scores on the measures of success. Also, because only 18.7% of the midshipmen admitted to the classes in this study are minorities and only 16.2% are female, this research will control for both ethnicity and gender.

E. SUMMARY

This literature review provided a summary of the literature on recruiting and orientation programs in the civilian sector, as well as realistic job previews and

expectation-lowering procedures. It also provided an overview of the Summer Seminar program and its participants. Finally, it established measures for successful performance by midshipmen.

Clearly, there is competition for high school talent in the work place as well as in academia. A common strategy used is the pre-exposure of young students to a particular career or institution in hopes of increased success or future interest in that institution or career. Given the proven success of this strategy in some cases, it is theorized that the Summer Seminar program will be positively correlated to success as a midshipman at the Naval Academy.

Specifically, more favorable graduation rates and increased academic cumulative quality point ratings for Summer Seminar participants are expected. No direct relation can be drawn between the literature and military or physical success. However, based on the overall positive effect of realistic job previews on performance in some cases, an increase in military and physical success for Summer Seminar participants is expected, as well. It is unknown what effect, if any, Summer Seminar participation will have on major selection.

III.   RESEARCH METHODOLOGY

A.   INTRODUCTION

This chapter introduces the data set used in this study. As well, it covers in depth the independent and dependent variables. The theory behind the regressions used is then reviewed. Finally, this chapter will introduce the regression models used for analysis in Chapter IV.

The cases for this study will be all of the midshipmen in the IR data warehouse from the Classes of 1997 through 2003 (n=8371) who at least began the first academic semester their Plebe year. This excludes all midshipmen who left during Plebe summer, before their first academic year started. With very few exceptions, this data was complete and valid. Data in the IR data warehouse is missing for some of the dependent variables for the Classes of 1997 and 1998, so cases with missing data will be excluded when analyzing these variables.

B.   DATA DESCRIPTION AND VARIABLES

1.   Data Description

All data for this study was obtained from the data warehouse maintained by IR at the Naval Academy (*Summer Seminar Data File*, 2003). IR received scores on all independent variables from the Office of Admissions, where they were recorded as each individual midshipman applied and was accepted to the Naval Academy. The independent variables are summarized in Table 6. All continuously scored independent variables, with the exception of Scholastic Aptitude Test (SAT) scores, were computed by the Office of Admissions based on information received in the candidates' admissions packages. The College Board reported SAT scores to the Naval Academy for each midshipman.

IR obtained scores on all dependent variables from departments responsible for the academic, military, and physical development of midshipmen. Members of these departments entered raw data on the midshipmen into multiple databases, which are organized by IR. Scores on all continuous dependent variables were calculated based on the raw data of the individual midshipman's performance in that area, taking into

consideration the weights presented in Chapter II. The dependent variables are summarized in Table 7.

2.   Independent Variables

The twelve independent variables summarized in Table 6 are used to determine if Summer Seminar participation has any unique effect on success at the Naval Academy. The focus variable is Summer Seminar Status, which indicates whether the case attended the Summer Seminar program or not. All independent variables are described below, with reference to their origin from the data dictionary maintained by IR (United States Naval Academy, 2003f).

Table 6.   Independent Variables

VARIABLE	TYPE OF DATA	RANGE OF VALUES
Minority Status	Nominal	Yes / No
Gender Status	Nominal	Female / Male
Combined ECA	Interval	300 - 800
Official HS Rank	Interval	200 - 800
HS Recommendations	Interval	409 - 1042
SAT Math	Interval	400 - 805
SAT Verbal	Interval	230 - 805
TIS	Interval	176 - 764
CIS	Interval	102 - 794
Preparatory School	Nominal	Yes / No
Prior Enlisted	Nominal	Yes / No
Summer Seminar Status	Nominal	Yes / No

Minority Status identifies whether or not the case is a minority, where minority is defined as any ethnicity but Caucasian. It is derived from the data dictionary variable ethnic_code, which describes the AIS ethnic codes used by the Office of Admissions. Originally, the two-character string values were CA, AF, NA, HI, AS, PU, FI, NH, and OT. All values except CA were recoded to a numeric value of 1. The value of CA, which represents Caucasian, was recoded to a numeric value of 0. This was done to allow for some variance due to the relatively low number of certain ethnic groups that apply and are accepted to the Naval Academy. All individuals (n=8371) had a valid entry for this variable. A very slight error is introduced due to the fact that all midshipmen from other countries had their ethnic_code entered as CA, and not all of these midshipmen are Caucasian. However, the number of these international midshipmen is less than 1 percent, so the error was left uncorrected (United States Naval Academy, 2003f, p. 3).

Gender Status identifies whether or not the case is a female or a male. It is derived from the data dictionary variable gender_code, which describes the gender of a midshipman. Originally, the one-character string values were F and M. F was recoded to a numeric value of 1, and M was recoded to a numeric value of 0. All cases (n=8371) had a valid entry for this variable (United States Naval Academy, 2003f, p. 28).

Combined ECA is taken directly from the data dictionary variable combined_eca, which is a normalized score developed by the Office of Admissions. It accounts for the high school athletic and non-athletic extra curricular activities (ECAs) that the applicant participated in. It is a numeric value that ranges from 300 to 800, with a higher score being more favorable. All cases except one (n=8370) had a valid entry for this variable. For one case, the data was missing (United States Naval Academy, 2003f, p. 80).

Official HS Rank is taken directly from the data dictionary variable hs_official_st_class_rank, which is a normalized score developed by the Office of Admissions that indicates high school class rank, taking into account factors such as high school class size. It is a numeric value that ranges from 200 to 800, with a higher score being more favorable. All cases (n=8371) had a valid entry for this variable (United States Naval Academy, 2003f, p. 82).

The variable HS Recommendations is taken directly from the data dictionary variable recommendations, which is a normalized score developed by the Office of Admissions that combines recommendation scores from the applicant's high school math and English teachers. It is a numeric value that ranges from 409 to 1042, with a higher score being more favorable. All cases (n=8371) had a valid entry for this variable (United States Naval Academy, 2003f, p. 86).

SAT Math is taken directly from the data dictionary variable satm_hi, which is the re-centered value of the applicant's highest SAT math score. When the SAT test was changed, scores from the new version were inflated when compared to the old version. To allow comparison between the old and new test, a re-centering of the old scores is required. This re-centering was done by IR at the SAT website. SAT Math is a numeric value that ranges from 400 to 805, with a higher score indicating greater mathematical abilities. It is noted that a score of 805, which is above the maximum allowed value of 800, is valid due to the re-centering. All cases (n=8371) had a valid entry for this variable (United States Naval Academy, 2003f, p. 86).

SAT Verbal is taken directly from the data dictionary variable satv_hi, which is the re-centered value of the applicant's highest SAT verbal score. As in the SAT Math variable, the re-centering for SAT Verbal was done by IR at the SAT website. It is a numeric value that ranges from 230 to 805, with a higher score indicating greater verbal abilities. It is noted that a score of 805, which is above the maximum allowed value of 800, is valid due to the re-centering. All cases (n=8371) had a valid entry for this variable (United States Naval Academy, 2003f, p. 87).

TIS is taken directly from the data dictionary variable tis_std, which is a score indicating technical interest that is derived from the applicant's answers to certain questions on the Strong Campbell Interest Inventory. It is a measure of the technical aptitude of the applicant. It is a numeric value that ranges from 176 to 764, with a higher score indicating greater technical aptitude. All cases except one (n=8370) had a valid entry for this variable. For one case, the data was missing (United States Naval Academy, 2003f, p. 87).

CIS is taken directly from the data dictionary variable cis_std, which is a score indicating career interest that is derived from the applicant's answers to certain questions on the Strong Campbell Interest Inventory. It is a measure of the career interest of the applicant. It is a numeric value that ranges from 102 to 794, with a higher score indicating greater interests in a particular skill. All cases except one (n=8370) had a valid entry for this variable. For one case, the data was missing (United States Naval Academy, 2003f, p. 80).

Preparatory School identifies whether or not the case attended preparatory school. It is derived from the data dictionary variable feeder_code, which describes the source from which the midshipman came to attend the Naval Academy. Originally, the one-character string values were B, F, K, N, and X. F and N are short-hand for the Foundation and NAPS sources, respectively, which are the two possible preparatory school feeder sources. F and N were recoded to a numeric value of 1, and all other values were recoded to a numeric value of 0. All cases (n=8371) had a valid entry for this variable (United States Naval Academy, 2003f, p. 81).

Prior Enlisted identifies whether or not the case is prior-enlisted. It is derived from the IR variable priors, which is calculated using the data dictionary variable mil_stat_mid. mil_stat_mid indicates the military status of the applicant coming from the fleet when applying to the Naval Academy. If the applicant had prior-enlisted service as indicated by mil_stat_mid, the variable priors was Y. Otherwise, it was N. Y was recoded to a numeric value of 1, and N was recoded to a numeric value of 0. All cases (n=8371) had a valid entry for this variable (United States Naval Academy, 2003f, p. 84).

Summer Seminar Status, the focus variable, identifies whether or not the case attended the Summer Seminar program. It is derived from the data dictionary variable summer_seminar, which indicates if the midshipman attended the Summer Seminar program. Originally, the one-character string values were Y and N. Y was recoded to a numeric value of 1, and N was recoded to a numeric value of 0. All cases (n=8371) had a valid entry for this variable (United States Naval Academy, 2003f, p. 87).

3. Dependent Variables

The seven dependent variables summarized in Table 7 are the measures of success for midshipmen used in this study, based on prior theses (FitzPatrick, 2001; Mishoe, 2000) and various Naval Academy instructions and guidelines. All dependent variables are described below, with reference to their origin from the IR data dictionary (United States Naval Academy, 2003f).

Table 7.   Dependent Variables

VARIABLE	TYPE OF DATA	RANGE OF VALUES
Graduated	Nominal	Yes / No
Academic CQPR	Ratio	2.00 - 4.00
Technical Major	Nominal	Yes / No
Military CQPR	Ratio	2.13 - 3.91
Striper	Nominal	Yes / No
Honor/Major Conduct Offenses	Nominal	Yes / No
Mean PRT	Ratio	60.0 - 99.9

Graduated identifies whether or not the case graduated from the Naval Academy. It is derived from the data dictionary variable mid_status_code, which indicates the graduation status associated with a midshipman. Originally, the two-character string values were 41, 40, and 30, where 41 and 40 indicate that a midshipman did graduated and 30 indicates that a midshipman did not graduate. 40 and 41 were recoded to a numeric value of 1, and 30 was recoded to a numeric value of 0. All cases (n=8371) had a valid entry for this variable. This is the only dependent variable where all cases will be used for the analysis. For the other six dependent variables, only the cases that successfully graduated from the Naval Academy (whose Graduated value equals 1) will be used (United States Naval Academy, 2003f, p. 92).

Academic CQPR is taken directly from the data dictionary variable cum_aqpr, which is the academic cumulative quality point rating for a midshipman. It is a numeric value that ranges from 2.00 to 4.00, with a higher score being more favorable. The only cases used for this dependent variable are those that graduated (n=6579), and all had valid entries (United States Naval Academy, 2003f, p. 71).

Technical Major identifies whether or not the case had an engineering or science major at the Naval Academy. It is derived from the data dictionary variable major_code, which indicates the major chosen by a midshipman. Originally, the four-character string values represented the thirty different major choices at the Naval Academy, including honors tracks, as shown in Table 8 (see Appendix A for a description of these acronyms). These 30 values were recoded into three groups, according to the orientation of the major. Engineering majors were recoded into a numeric value of 1, science majors were recoded into a numeric value of 2, and all others were recoded into a numeric value of 3. Finally, these three groups were recoded to combine engineering and science majors into a technical group. From the intermediate variable, numeric values of 1 and 2 were recoded into a numeric value of 1, and the numeric value of 3 was recoded into a numeric value of 0. The only cases used for this dependent variable are those that graduated (n=6579), and all had valid entries (United States Naval Academy, 2003f, p. 39).

Table 8.   Academic Major Codes

ENGINEERING		SCIENCE		OTHER	
EAS	ESE	SAS	SMAH	FEC	HHSH
EASA	ESP	SCH	SOC	FECH	
EEE		SCS	SOCH	FPS	
EGE		SGS	SPH	FPSH	
EME		SMA	SPS	HEG	
ENA		SMAA	SQE	HEGH	
EOE		SMAC		HHS	

Military CQPR is taken directly from the data dictionary variable cum_mqpr, which is the military cumulative quality point rating for a midshipman. It is a numeric value that ranges from 2.13 to 3.91, with a higher score being more favorable. The only cases used for this dependent variable are those that graduated (n=6579), and all had valid entries (United States Naval Academy, 2003f, p. 71).

Striper identifies whether or not the case held a striper position at the Naval Academy. The definition of a striper in this study includes midshipmen in the rank of Midshipman Lieutenant and above for First Class Midshipmen, Midshipman Sergeant Major or Midshipman First Sergeant for Second Class Midshipmen, and varsity and junior varsity team captains. It is derived from two variables in the data dictionary. The first variable is rank, which indicates the rank of a striper billet held by a midshipman. The four-character string values were LT, LCDR, CDR, CAPT, 1SGT, SMAJ for the billets of interest. The data obtained from IR had one of these values in the rank variable if the midshipman had held a striper position of interest, some other value if they had held a lesser striper position, and a null value if they had not held any striper position. If any of the six mentioned string values were present, they were recoded in an intermediate variable as a numeric value of 1. The null value, along with any ranks other than the above mentioned six, were recoded in the same intermediate variable as a numeric value of 0 (United States Naval Academy, 2003f, p. 95).

The second variable from the data dictionary that Striper is derived from is position, which indicates a midshipman's position on a varsity or junior varsity sports team. The ten-character string value was CAPTAIN for the position of interest. The data obtained from IR had CAPTAIN as a value in the position variable if the midshipman had been a varsity or junior varsity team captain, and a null value if they had only been a team member or not been on a varsity or junior varsity team at all. If the string value of CAPTAIN was present, it was recoded in a second intermediate variable as a numeric value of 1. The null value was recoded in the second intermediate variable as a numeric value of 0 (United States Naval Academy, 2003f, p. 108).

The variable Striper was created by looking at the two intermediate variables. Two intermediate variables were needed because the Naval Academy places equal

importance on military and athletic leadership positions, although in most cases they are mutually exclusive. Striper was given a numeric value of 1 if either the first or the second intermediate variable, or both intermediate variables, were 1. It was given a numeric value of 0 if both intermediate variables were 0. This resulted in the variable Striper representing all stripers, as defined above, and all varsity and junior varsity team captains. The only cases used for this dependent variable are those that graduated (n=6579), and all had valid entries.

Honor/Major Conduct Offenses identifies whether or not the case committed an honor or major conduct offense at the Naval Academy. It is derived from the offense_description variable in the data dictionary, which is a thirty-character string containing a description of the honor or conduct offense violated. The data obtained from IR was only for honor and major conduct violators, and had some value in the offense_description variable describing the offense if the midshipman had committed an honor or major conduct violation. The offense_description variable had a null value if they had not. If any string value besides null was present, it was recoded to a numeric value of 1. The null value was recoded to a numeric value of 0. The only cases used for this dependent variable are those that graduated (n=6579). As well, no data was available for the members of the Class of 1997 who graduated (n=952), leaving only 5627 cases to be analyzed for this dependent variable (United States Naval Academy, 2003f, p. 13).

Mean PRT is an average of a midshipman's PRT scores taken during the spring semester in each of their four years at the Naval Academy. Values range from 60.0 to 99.9, with a higher value being more favorable. The individual semester scores were obtained from IR, but have no counterpart in the data dictionary. Mean PRT was created by taking a midshipman's four individual semester scores and mathematically averaging them. Six individual semester scores were greater than the maximum allowed value of 100.0, so they were not included when creating the average PRT score for their respective cases. The only cases used for this dependent variable are those that graduated (n=6579). As well, scores for the PRT were not available prior to the spring of 1999. For this reason, no data was available for the members of the Classes of 1997 and 1998 who graduated (n=1875). Also, there was missing data for 97 members of the Classes of 1999

through 2003 who graduated. This left 4607 cases to be analyzed for this dependent variable.

Another consideration, given the fact that PRT data was not available prior to the spring of 1999, is that the average PRT scores for the members of the Classes of 1999 through 2001 will be affected. For the Class of 1999, there is only one individual score to average. For these cases, that one score is the average score. Likewise, the average PRT score for members of the Classes of 2000 and 2001 includes only two and three individual scores, respectively.

4.   Descriptive Statistics

Table 9 presents frequencies for all discrete independent variables and Table 10 presents frequencies for all discrete dependent variables. All cases that are missing values for certain discrete dependent variables have been previously explained. Table 11 presents descriptives for all continuous variables, both independent and dependent. This data indicates a normal distribution of data for all of these variables, making them ideal for linear regression. As with the discrete variables, all cases that are missing values for specific continuous independent and dependent variables have been previously explained.

Table 9.   Discrete Independent Variable Frequencies

Minority Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	6804	81.3	81.3	81.3
	Yes	1567	18.7	18.7	100.0
	Total	8371	100.0	100.0	

Gender Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Men	7017	83.8	83.8	83.8
	Women	1354	16.2	16.2	100.0
	Total	8371	100.0	100.0	

Preparatory School

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	6557	78.3	78.3	78.3
	Yes	1814	21.7	21.7	100.0
	Total	8371	100.0	100.0	

Prior Enlisted

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	7328	87.5	87.5	87.5
	Yes	1043	12.5	12.5	100.0
	Total	8371	100.0	100.0	

Summer Seminar Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	6512	77.8	77.8	77.8
	Yes	1859	22.2	22.2	100.0
	Total	8371	100.0	100.0	

Table 10.   Discrete Dependent Variable Frequencies

Graduated

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Attrite	1792	21.4	21.4	21.4
	Graduate	6579	78.6	78.6	100.0
	Total	8371	100.0	100.0	

Technical Major

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non-technical Major	2631	31.4	40.0	40.0
	Technical Major	3948	47.2	60.0	100.0
	Total	6579	78.6	100.0	
Missing	System	1792	21.4		
Total		8371	100.0		

Striper

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4994	59.7	75.9	75.9
	Yes	1585	18.9	24.1	100.0
	Total	6579	78.6	100.0	
Missing	System	1792	21.4		
Total		8371	100.0		

Honor/Major Conduct Offenses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4163	49.7	74.0	74.0
	Yes	1464	17.5	26.0	100.0
	Total	5627	67.2	100.0	
Missing	System	2744	32.8		
Total		8371	100.0		

Table 11. Descriptives for Continuous Variables

Variable	N	Range	Min	Max	Mean	Std.	Variance	Skewness	Std. Error	Kurtosis	Std. Error
Combined ECA	8370	500	300	800	554.30	70.30	4941.82	.107	.027	.426	.054
Official HS Rank	8371	600	200	800	568.20	106.47	11335.50	.211	.027	-.410	.054
HS Recommendations	8371	633	409	1042	877.96	91.22	8320.38	-.618	.027	.407	.054
SAT Math	8371	405	400	805	659.44	61.47	3778.30	.009	.027	.101	.054
SAT Verbal	8371	575	230	805	633.77	67.16	4510.50	-.118	.027	.566	.054
TIS	8370	588	176	764	494.03	95.13	9048.87	-.098	.027	-.452	.054
CIS	8370	692	102	794	495.29	97.92	9587.95	-.226	.027	-.103	.054
Academic CQPR	6579	2.00	2.00	4.00	2.95	0.47	0.23	.222	.030	-.824	.060
Military CQPR	6579	1.78	2.13	3.91	3.14	0.32	0.10	-.212	.030	-.515	.060
Mean PRT	4607	39.90	60.00	99.90	83.68	8.68	75.31	-.313	.036	-.663	.072

C. REGRESSION THEORY

1. Logistic Regression

A logistic regression is used to predict discrete dependent variables from a group of independent variables that may be discrete, continuous, or a mix of both. The goal of analysis using a logistic regression is to correctly predict the outcome category for each case. Many research questions can be answered, including prediction of group membership and the importance of independent variables (Tabachnick & Fidell, 2001).

Because a logistic regression is a nonlinear model, the equations used to describe the regression are complex. The dependent variable, Y, is the probability of having one outcome or another based on the best linear combination of independent variables, with two outcomes:

$$Y_i = e^u / (1+e^u)$$

where Y_I is the estimated probability that the ith case ($I = 1,…,n$) is in one of the categories and u is the usual linear regression equation:

$$u = A + B_1X_1 + B_2X_2 + … + B_kX_k$$

with constant A, coefficients B_j, and independent variables X_j for k independent variables ($j = 1, 2, …, k$). This linear regression equation creates the logit, or log of the odds:

$$\ln (Y / (1 - Y)) = A + \sum B_jX_{ij}$$

or more simply the natural log ($\log_e$) of the probability of being in one group divided by the probability of being in the other group. Coefficients are estimated by converging on values that maximize the likelihood of obtaining observed frequencies (Tabachnick & Fidell, 2001).

The goodness of fit for a logistic regression is determined by the chi-squared statistic (χ^2). χ^2 is normally used in judging the independence of two variables. In this context, it is limited by the sample size and the extent of the departure from independence. Also, it reveals nothing on how the two variables are related, just the extent to which they are or not. In order to use χ^2 to determine goodness of fit, it must be modified to avoid these limitations (Norušis, 2002). To accomplish this, χ^2 is calculated on the difference in the log-likelihoods between the model including independent variables and the model including only the constant (A) (Tabachnick & Fidell, 2001).

There are many types of logistic regressions, including direct, hierarchical, and stepwise. In a direct logistic regression, all independent variables are entered into the regression at the same time. This method is useful if no hypothesis exists for the outcome of the regression, and takes into account the unique contribution of each independent variable. A hierarchical logistic regression allows the user to specify the order of entry of independent variables into the regression, and is useful for controlling for factors that prior research has shown will affect the dependent variable. This method takes into account the unique contribution of each independent variable, as well as the overlapping contribution of independent variables, in each step. When a hierarchical logistic regression is used, it is important to enter the independent variable of concern in the last step of the regression. In a stepwise logistic regression, inclusion and exclusion of independent variables are based on statistical tests. The user has no input as to which independent variables are included, and in what order they are included (Tabachnick & Fidell, 2001).

While the major limitation of a logistic regression is that the dependent variable has to be discrete, there are other things to take into consideration. It is important to have enough cases in relation to the number of independent variables. There is an assumption of linearity between continuous independent variables and the logit transformation of the

dependent variable, but not the dependent variable itself. There must be an absence of multicollinearity and outliers, as well as independence of errors. Finally, it is important to remember that significantly relating a dependent variable to some independent variables does not imply that the dependent variable is caused by the independent variable (Tabachnick & Fidell, 2001).

2. Linear Regression

A linear regression is used to assess the relationship of one continuous dependent variable to multiple continuous independent variables. The goal of analysis using a linear regression is to correctly predict the value of the dependent variable, given values for the independent variables. Research questions that can be answered include the degree of relationship of the variables, the relative importance of the independent variables, and prediction of dependent variable values (Tabachnick & Fidell, 2001).

Being linear in nature, the equation for a linear regression is far simpler than for a logistic regression. It takes the form:

$$Y = A + B_1X_1 + B_2X_2 + \ldots + B_kX_k$$

where Y is the predicted value of the dependent variable, A is the Y intercept, the Xs are the independent variables ($n = k$), and the Bs are the coefficients of the independent variables in the regression equation. To obtain the regression equation, the sum of the squared difference between actual and predicted Y values for k cases will be minimized (Tabachnick & Fidell, 2001).

To ascertain how well the linear combination of independent variables predicts the dependent variable, a multiple correlation (R) is calculated. R is a Pearson product-moment correlation coefficient between the predicted dependent variable scores and the actual scores. R ranges from 0 to 1. In order to interpret R, it is squared. This R^2 term indicates the percent of variance in the dependent variable accounted for by the independent variables (Green, Salkind, & Akey, 2000).

Like logistic regressions, linear regressions can be direct, hierarchical, or stepwise, with the same benefits and drawbacks for each. However, there are a few different limitations for linear regressions. The major one is that both the dependent and independent variables must be continuous, and a linear relationship is assumed between

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dependent and independent variables. Too many or too few cases can confound a linear regression, and in addition to the absence of multicollinearity and outliers, the absence of singularity is assumed. Finally, normality, homoscedasticity, and independence of errors are assumed. Again, it is important to remember that significantly relating a dependent variable to some independent variable does not imply causality (Tabachnick & Fidell, 2001).

D. MODELS OF REGRESSIONS

1. Logistic Regression

Of the dependent variables previously introduced, four are comprised of discrete data. These variables are Graduated, Technical Major, Striper, and Honor/Major Conduct Offenses. As the literature on research theory states (Norušis, 2002; Tabachnick & Fidell, 2001), a logistic regression must be used when the dependent variable is discrete.

The independent variables will be entered into the regression hierarchically, in four different steps. This will allow for a determination of the unique effect by each group of independent variables on the variance in the dependent variable, taking into consideration the variance accounted for by the previously entered groups of independent variables. The final result will also include the shared variance between the groups of independent variables.

The order in which the independent variables will be input into the regression is depicted in Table 12. For each step, the new variables entered are displayed in bold. Step 1 begins with the two demographic variables. Step 2 adds the seven variables primarily considered by the Office of Admissions when screening applicants. Step 3 includes factors that have been shown to significantly affect aspects of performance at the Naval Academy (FitzPatrick, 2001; Mishoe, 2000). Finally, step 4 inputs whether or not the midshipman participated in the Summer Seminar program. By adding this variable last, in its own step, it is possible to determine the unique variance in the dependent variable accounted for by participation in the Summer Seminar program, while first taking into account the variance accounted for by the other independent variables.

Table 12.   Order of Independent Variable Entry for Regressions

STEP 1	STEP 2	STEP 3	STEP 4
Minority Status	Minority Status	Minority Status	Minority Status
Gender Status	Gender Status	Gender Status	Gender Status
	Combined ECA	Combined ECA	Combined ECA
	Official HS Rank	Official HS Rank	Official HS Rank
	HS Recommendations	HS Recommendations	HS Recommendations
	SAT Math	SAT Math	SAT Math
	SAT Verbal	SAT Verbal	SAT Verbal
	TIS	TIS	TIS
	CIS	CIS	CIS
		Preparatory School	Preparatory School
		Prior Enlisted	Prior Enlisted
			Summer Seminar Status

The results of each logistic regression will be looked at overall and then by individual variable. Overall, the significance (p) will be checked first to see if the variables entered were significant. Next, the chi-squared value (χ^2) and the Nagelkerke R^2 value will be examined to determine goodness-of-fit. For individual variables, the significance (p) will be checked first to see if the individual variable was significant within the step. Wald statistics ($\underline{z}$) and odds ratios will then be compared to determine the weight of the variable.

The statistical package used to perform the logistic regressions in this study is SPSS version 11.5. The specific regression used from SPSS is binary logistic, which can

be found under the analyze->regression menu. A binary logistic regression is used because all four of the discrete dependent variables have only two possible values.

2.   Linear Regression

Of the dependent variables previously discussed, three are comprised of continuous data. These variables are Academic CQPR, Military CQPR, and Mean PRT. As the literature on research theory states (Green et al., 2000; Tabachnick & Fidell, 2001), a linear regression may be used when the dependent variable is continuous. This research also states that the independent variables used must be continuous. As depicted in Table 6, five of the independent variables used in this study are comprised of discrete, not continuous, data. However, all of these variables are dichotomous, with the only two acceptable values being either 1 or 0. 1 indicates the case possesses the quality being measured by the variable, and 0 indicates the case lacks the quality. For example, in the variable Summer Seminar Status, a 1 indicates attendance at the Summer Seminar program and a 0 indicates the lack of attendance. For this reason, these five independent variables will be treated as continuous variables for the purpose of linear regressions, with a theoretical range of values for each variable between 1 and 0.

The independent variables will be entered into the regression hierarchically, in four different steps. This will allow for a determination of the unique effect by each group of independent variables on the variance in the dependent variable, taking into consideration the variance accounted for by the previously entered groups of independent variables. The final result will also include the shared variance between the groups of independent variables. The order in which the independent variables will be input into the regression is the same as for the logistic regression, and can be reviewed in Table 12.

The results of each linear regression will be looked at overall and then by individual variable. Overall, the significance (p) will be checked first to see if the variables entered were significant. Next, the f value and the Adjusted R^2 value will be examined to determine the variance accounted for by the independent variables. For individual variables, the significance (p) will be checked first to see if the individual variable was significant within the step. Standardized regression coefficients (beta) will then be compared to determine the weight of the variable.

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The statistical package used to perform the linear regressions in this study is SPSS version 11.5. The specific regression used from SPSS is linear, which can be found under the analyze->regression menu.

E. SUMMARY

In this chapter, the data set used in this study was introduced and the independent and dependent variables were discussed in depth. As well, the theory for the regressions to be used was reviewed. Finally, an overview of how these regressions will be used in this study has been provided. Chapter IV uses these regressions to analyze each of the seven dependent variables in order to determine the unique effect on each of participation in the Summer Seminar program.

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IV. DATA ANALYSIS

A. INTRODUCTION

This chapter presents the results of correlation and regression analyses of the data. First-order, bivariate correlational analyses are presented in the first section. Regression analyses of academic, military, and physical performance are presented in the following three sections. The final section provides a summary of significant findings.

B. CORRELATIONAL ANALYSES

Pearson correlation coefficients were computed among variables in the study. Table 13 presents the means, standard deviations, and first-order, bivariate correlation coefficients for eighteen of the nineteen variables included in the study. Examination of the correlation matrix shows that 123 of the 153 correlations computed were statistically significant at the 0.05 level. Means and standard deviations for Minority Status, Gender Status, Preparatory School, Prior Enlisted, Summer Seminar Status, Technical Major, Striper, and Honor/Major Conduct Offenses were not computed because these variables were dichotomously scored. In addition, the mean, standard deviation, and correlation coefficients were not computed for Graduated because the data file only contained scores for successful graduates, making Graduated a constant when correlated listwise with the other variables.

Table 13. Correlation Matrix

	Mean	Std.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Minority Status (1)			1																	
Gender Status (2)			.03 ns	1																
Combined ECA (3)	555.30	70.50	-.10	.05	1															
Official HS Rank (4)	568.40	105.62	-.11	.12	.14	1														
HS Recommendations (5)	882.59	94.32	-.06	.07	.14	.30	1													
SAT Math (6)	662.32	62.03	-.23	-.09	-.05	.33	.08	1												
SAT Verbal (7)	634.14	65.66	-.20	.05	-.04	.28	.10	.45	1											
TIS (8)	494.26	94.59	-.01 ns	-.21	-.17	.02 ns	-.07	.14	-.16	1										
CIS (9)	495.77	97.45	-.05	-.09	.03 ns	.06	.02 ns	.11	-.03	.21	1									
Preparatory School (10)			.16	-.04	-.06	-.42	-.12	-.44	-.35	-.06	-.06	1								
Prior Enlisted (11)			.10	-.06	-.15	-.24	.03	-.18	-.15	-.05	.01 ns	.33	1							
Summer Seminar Status (12)			-.02 ns	.07	.07	.15	.04	.17	.23	-.02 ns	.02 ns	-.17	-.16	1						
Academic CQPR (13)	2.97	0.47	-.19	.00 ns	.02 ns	.48	.18	.45	.35	-.00 ns	.09	-.31	-.10	.14	1					
Technical Major (14)			-.02 ns	-.05	-.07	.15	.04	.26	-.00 ns	.39	.17	-.12	.02 ns	.02 ns	.15	1				
Military CQPR (15)	3.13	0.32	-.20	.02 ns	.13	.37	.21	.26	.22	.01 ns	.08	-.21	-.08	.13	.71	.15	1			
Striper (16)			-.07	.04	.15	.12	.11	.07	.05	-.08	.00 ns	-.05	-.02 ns	.05	.26	.03	.46	1		
Honor/Major Conduct Offenses (17)			.04	-.02 ns	-.01 ns	-.13	-.08	-.05	-.07	-.02 ns	-.06	.06	.04	-.02 ns	-.18	-.05	-.33	-.10	1	
Mean PRT (18)	83.69	8.68	-.05	-.02 ns	.12	.09	.04	.01 ns	-.04	-.01 ns	-.06	-.03 ns	-.08	.05	.25	.00 ns	.45	.20	-.01 ns	1

Note: All correlations are significant at $p < 0.05$ (2-tailed) unless otherwise noted.

As shown in Table 13, Summer Seminar Status was positively correlated with Gender Status, Combined ECA, Official HS Rank, HS Recommendations, SAT Math, SAT Verbal, Academic CQPR, Military CQPR, Striper, and Mean PRT. These results indicate that midshipmen who attended the Summer Seminar program were more likely to be female, have participated in more high school extracurricular activities, have a higher high school class rank and teacher recommendation scores, and have higher scores on both the math and verbal section of the SAT when compared with midshipmen who did not attend the program. In addition, Summer Seminar midshipmen were more likely to have a higher academic cumulative quality point rating and military cumulative quality point rating, have been stripers, and have scored higher on their physical readiness test than their non-Summer Seminar counterparts. Summer Seminar Status was also negatively correlated with Preparatory School and Prior Enlisted, indicating that Summer Seminar participants were less likely to have attended preparatory school or have prior-enlisted service than midshipmen who did not attend Summer Seminar.

Other correlations of interest include those having to do with demographic variables and proven indicators of success. Minority Status was positively correlated with Honor/Major Conduct Offenses, indicating that minorities were more likely to have honor or major conduct offense in their records than non-minorities. Minority Status was also negatively correlated with Combined ECA, Official HS Rank, HS Recommendations, SAT Math, SAT Verbal, CIS, Academic CQPR, Military CQPR, Striper, and Mean PRT. These results indicate that minorities were likely to have participated in fewer high school extracurricular activities, have a lower high school class rank and teacher recommendation scores, have lower math and verbal SAT scores, have a lower career interest score on the modified SCII, have a lower academic cumulative quality point rating and military cumulative quality point rating, have less of a chance of being a striper, and scored lower on their physical readiness test than non-minorities.

Gender Status was positively correlated with Combined ECA, Official HS Rank, HS Recommendations, SAT Verbal, and Striper, indicating that females were more likely to have participated in more high school extracurricular activities, have a higher high school class rank and teacher recommendation scores, have a higher verbal SAT score,

and have a greater chance of becoming a striper than males at the Naval Academy. Gender Status was also negatively correlated with SAT Math, TIS, CIS, and Technical Major. These results indicate that females were more likely to have lower math SAT scores, have a lower technical and career interest score on the modified SCII, and be non-technical majors than males at the Naval Academy.

Preparatory School was positively correlated with Minority Status, Prior Enlisted, and Honor/Major Conduct Offenses, indicating that midshipmen who attended preparatory school were more likely to be minorities, have prior-enlisted service, and have an honor or major conduct offense in their records than midshipmen who did not attend preparatory school. Preparatory School was also negatively correlated with Gender Status, Combined ECA, Official HS Rank, HS Recommendations, SAT Math, SAT Verbal, TIS, CIS, Academic CQPR, Technical Major, Military CQPR, and Striper. These results indicate that preparatory school attendees were more likely to be male, have participated in fewer high school extracurricular activities, have a lower high school class rank and teacher recommendation scores, have lower math and verbal SAT scores, have a lower technical and career interest score on the modified SCII, have a lower academic cumulative quality point rating and military cumulative quality point rating, have a non-technical major, and have less a chance of being a striper than midshipmen who did not attend preparatory school.

Prior Enlisted was positively correlated with Minority Status, HS Recommendations, and Honor/Major Conduct Offenses, indicating that prior-enlisted midshipmen were more likely to be minorities, have better high school teacher recommendation scores, and have an honor or major conduct offense in their records than midshipmen without prior-enlisted service. Prior Enlisted was also negatively correlated with Gender Status, Combined ECA, Official HS Rank, SAT Math, SAT Verbal, TIS, Academic CQPR, Military CQPR, and Mean PRT. These results indicate that prior-enlisted midshipmen were more likely to be male, have participated in fewer high school extra-curricular activities, have a lower high school class rank, have lower math and verbal SAT scores, have a lower technical interest score on the modified SCII, have a lower academic cumulative quality point rating and military cumulative quality point

rating, and have scored lower on their physical readiness test than midshipmen who are not prior-enlisted.

C. REGRESSION ANALYSES OF SUMMER SEMINAR PARTICIPATION ON ACADEMIC PERFORMANCE VARIABLES

1. Graduation Rate

Table 14 presents the results of the hierarchical logistic regression analysis of Summer Seminar participation on graduation rates. This analysis incorporates several types of control variables to examine the unique effect of Summer Seminar participation on graduation rates. Table 14 displays statistics for each of the independent variables entered on each of the four steps included in the model. Beta weights with standard error, Wald coefficients, the degrees of freedom, the significance, and odds ratios associated with each variable in the model are also displayed. Variables entered on each step are depicted in bold on the respective step.

Results of the hierarchical logistic regression analysis were significant $\chi^2(12)=167.323$ (p<0.001), indicating that Summer Seminar participation was predictive of higher graduation rates. It is worth noting that the impact of the Summer Seminar program on graduation rates was significant even after controlling for demographic and admissions variables, as well as proven indicators of success. The model accounted for 3.1% of the variance in graduation rate (Nagelkerke R^2=.031). Summer Seminar participants were 1.26 times more likely to graduate when compared to non-participants.

Additionally, Minority Status, Gender Status, Combined ECA, Official HS Rank, HS Recommendations, SAT Math, and Preparatory School significantly predicted graduation rates. These results indicate that midshipmen were more likely to graduate from the Naval Academy if they participated in more high school extracurricular activities, had a higher high school class rank or teacher recommendation scores, had a higher math SAT score, or attended preparatory school. They were less likely to graduate from the Naval Academy if they were a minority or a female.

Table 14.   Regression Results for Graduation Rate

Step	Independent Variable	B	Std. Error	Wald	df	Sig.	Exp(B)
1	(Constant)	1.466	.033	1961.519	1	.000	4.331
	Minority Status	-.360	.065	30.905	1	.000	.697
	Gender Status	-.509	.033	57.767	1	.000	.601
2	(Constant)	-1.022	.517	3.901	1	.048	.360
	Minority Status	-.282	.068	17.036	1	.000	.755
	Gender Status	-.528	.071	55.899	1	.000	.590
	Combined ECA	.001	.000	5.909	1	.015	1.001
	Official HS Rank	.001	.000	10.377	1	.001	1.001
	HS Recommendations	.001	.000	9.465	1	.002	1.001
	SAT Math	.001	.001	6.137	1	.013	1.001
	SAT Verbal	-.001	.000	3.425	1	.064	.999
	TIS	.000	.000	.435	1	.509	1.000
	CIS	.000	.000	1.656	1	.198	1.000
3	(Constant)	-1.664	.559	8.864	1	.003	.189
	Minority Status	-.286	.068	17.520	1	.000	.751
	Gender Status	-.524	.071	54.612	1	.000	.592
	Combined ECA	.001	.000	5.598	1	.018	1.001
	Official HS Rank	.001	.000	14.684	1	.000	1.001
	HS Recommendations	.001	.000	10.508	1	.001	1.001
	SAT Math	.002	.001	10.025	1	.002	1.002
	SAT Verbal	-.001	.000	2.068	1	.150	.999
	TIS	.000	.000	.539	1	.463	1.000
	CIS	.000	.000	2.038	1	.153	1.000
	Preparatory School	.325	.083	15.290	1	.000	1.384
	Prior Enlisted	-.190	.092	4.210	1	.040	.827
4	(Constant)	-1.396	.565	6.113	1	.013	.248
	Minority Status	-.303	.069	19.526	1	.000	.739
	Gender Status	-.539	.071	57.340	1	.000	.583
	Combined ECA	.001	.000	4.660	1	.031	1.001
	Official HS Rank	.001	.000	14.712	1	.000	1.001
	HS Recommendations	.001	.000	10.143	1	.001	1.001
	SAT Math	.002	.001	8.355	1	.004	1.002
	SAT Verbal	-.001	.000	3.596	1	.058	.999
	TIS	.000	.000	.464	1	.496	1.000
	CIS	.000	.000	1.898	1	.168	1.000
	Preparatory School	.327	.083	15.569	1	.000	1.387
	Prior Enlisted	-.158	.093	2.890	1	.089	.854
	Summer Seminar Status	.230	.070	10.709	1	.001	1.259

Note: Nagelkerke R^2 for step 1 = .016, for step 2 = .026, for step 3 =.029, and for step 4 = .031

2.   Academic Cumulative Quality Point Rating

Table 15 presents the results of the hierarchical linear regression analysis of Summer Seminar participation on academic cumulative quality point ratings. This analysis incorporates several types of control variables to examine the unique effect of Summer Seminar participation on academic cumulative quality point ratings. Table 15 displays statistics for each of the independent variables entered on each of the four steps included in the model. Beta weights with standard error, standardized betas, t statistics, and the significance associated with each variable in the model are also displayed. Variables entered on each step are depicted in bold on the respective step.

Results of the hierarchical linear regression analysis were significant $f(12,6578)=286.120$ (p<0.001), indicating that Summer Seminar participation was predictive of higher academic cumulative quality point ratings. Although the magnitude of this effect was small (beta=.033), it is worth noting that the impact of the Summer Seminar program on academic cumulative quality point ratings was significant even after controlling for demographic and admissions variables, as well as proven indicators of success. The model accounted for 34.2% of the variance in cumulative academic quality point ratings (Adjusted R^2=.342).

Additionally, Minority Status, Gender Status, Combined ECA, Official HS Rank, HS Recommendations, SAT Math, SAT Verbal, TIS, CIS, Preparatory School, and Prior Enlisted significantly predicted academic cumulative quality point ratings. These results indicate that midshipmen were more likely to have a higher cumulative academic quality point rating if they had a higher high school class rank or teacher recommendation scores, had a higher math or verbal SAT score, had a higher career interest score on the modified SCII, or were prior-enlisted. They were more likely to have a lower academic cumulative quality point rating if they were a minority or a female, participated in more high school extracurricular activities, had a higher technical interest score on the modified SCII, or attended preparatory school.

Table 15.   Regression Results for Academic Cumulative Quality Point Rating

Step	Independent Variable	B	Std. Error	beta	t	Sig.
1	(Constant)	2.992	.007		445.774	.000
	Minority Status	-.258	.015	-.207	-17.109	.000
	Gender Status	.015	.016	.011	.942	.346
2	(Constant)	.262	.092		2.838	.005
	Minority Status	-.108	.013	-.087	-8.281	.000
	Gender Status	-.038	.014	-.028	-2.683	.007
	Combined ECA	.000	.000	-.044	-4.180	.000
	Official HS Rank	.002	.000	.336	29.364	.000
	HS Recommendations	.000	.000	.043	4.104	.000
	SAT Math	.002	.000	.267	22.268	.000
	SAT Verbal	.001	.000	.110	9.350	.000
	TIS	.000	.000	-.054	-4.953	.000
	CIS	.000	.000	.036	3.466	.001
3	(Constant)	.279	.100		2.788	.005
	Minority Status	-.110	.013	-.088	-8.398	.000
	Gender Status	-.036	.014	-.027	-2.563	.010
	Combined ECA	.000	.000	-.040	-3.751	.000
	Official HS Rank	.001	.000	.335	28.022	.000
	HS Recommendations	.000	.000	.039	3.658	.000
	SAT Math	.002	.000	.264	21.416	.000
	SAT Verbal	.001	.000	.110	9.275	.000
	TIS	.000	.000	-.053	-4.847	.000
	CIS	.000	.000	.034	3.325	.001
	Preparatory School	-.033	.014	-.029	-2.278	.023
	Prior Enlisted	.056	.017	.038	3.324	.001
4	(Constant)	.322	.101		3.194	.001
	Minority Status	-.113	.013	-.090	-8.591	.000
	Gender Status	-.038	.014	-.028	-2.701	.007
	Combined ECA	.000	.000	-.041	-3.911	.000
	Official HS Rank	.001	.000	.335	28.044	.000
	HS Recommendations	.000	.000	.038	3.601	.000
	SAT Math	.002	.000	.262	21.144	.000
	SAT Verbal	.001	.000	.105	8.689	.000
	TIS	.000	.000	-.054	-4.899	.000
	CIS	.000	.000	.034	3.304	.001
	Preparatory School	-.032	.014	-.028	-2.229	.026
	Prior Enlisted	.061	.017	.042	3.634	.000
	Summer Seminar Status	.037	.012	.033	3.136	.002

Note: Adjusted R^2 for step 1 = .042, for step 2 = .340, for step 3 =.341, and for step 4 = .342

3. Major Selection

Table 16 presents the results of the hierarchical logistic regression analysis of Summer Seminar participation on major selection. This analysis incorporates several types of control variables to examine the unique effect of Summer Seminar participation on major selection. Table 16 displays statistics for each of the independent variables entered on each of the four steps included in the model. Beta weights with standard error, Wald coefficients, the degrees of freedom, the significance, and odds ratios associated with each variable in the model are also displayed. Variables entered on each step are depicted in bold on the respective step.

Results of the hierarchical logistic regression analysis were significant χ^2 (12)=1631.333 (p<0.001). However, examination of the beta weight coefficient suggests that Summer Seminar participation did not predict unique variance beyond that associated with previously included variables. Thus, Summer Seminar participation did not influence major selection.

Overall, the model accounted for 29.7% of the variance in major selection (Nagelkerke R^2=.297). Individual variables that significantly predicted major selection include Minority Status, Gender Status, Official HS Rank, SAT Math, SAT Verbal, TIS, CIS, Preparatory School, and Prior Enlisted. These results indicate that midshipmen were more likely to choose a technical major if they were a minority, a female, had a higher high school class rank, had a higher math SAT score, had a higher technical or career interest score on the modified SCII, or were prior-enlisted. They were less likely to choose a technical major if they had a higher verbal SAT score or attended preparatory school.

Table 16.   Regression Results for Major Selection

Step	Independent Variable	B	Std. Error	Wald	df	Sig.	Exp(B)
1	(Constant)	.464	.030	245.340	1	.000	1.591
	Minority Status	-.125	.066	3.572	1	.059	.883
	Gender Status	-.249	.071	12.473	1	.000	.780
2	(Constant)	-10.843	.586	342.329	1	.000	.000
	Minority Status	.210	.078	7.266	1	.007	1.233
	Gender Status	.322	.083	15.179	1	.000	1.380
	Combined ECA	-.001	.000	8.288	1	.004	.999
	Official HS Rank	.002	.000	40.182	1	.000	1.002
	HS Recommendations	.001	.000	7.193	1	.007	1.001
	SAT Math	.009	.001	249.319	1	.000	1.009
	SAT Verbal	-.003	.001	27.873	1	.000	.997
	TIS	.009	.000	646.290	1	.000	1.009
	CIS	.002	.000	43.970	1	.000	1.002
3	(Constant)	-11.486	.638	324.228	1	.000	.000
	Minority Status	.180	.078	5.301	1	.021	1.197
	Gender Status	.362	.083	18.938	1	.000	1.437
	Combined ECA	-.001	.000	3.345	1	.067	.999
	Official HS Rank	.002	.000	47.045	1	.000	1.002
	HS Recommendations	.001	.000	2.861	1	.091	1.001
	SAT Math	.010	.001	248.903	1	.000	1.010
	SAT Verbal	-.002	.001	22.838	1	.000	.998
	TIS	.009	.000	660.663	1	.000	1.009
	CIS	.002	.000	41.548	1	.000	1.002
	Preparatory School	-.175	.085	4.202	1	.040	.840
	Prior Enlisted	.765	.101	56.741	1	.000	2.148
4	(Constant)	-11.514	.644	319.860	1	.000	.000
	Minority Status	.182	.078	5.380	1	.020	1.200
	Gender Status	.364	.083	19.037	1	.000	1.439
	Combined ECA	-.001	.000	3.284	1	.070	.999
	Official HS Rank	.002	.000	47.055	1	.000	1.002
	HS Recommendations	.001	.000	2.882	1	.090	1.001
	SAT Math	.010	.001	248.279	1	.000	1.010
	SAT Verbal	-.002	.001	21.867	1	.000	.998
	TIS	.009	.000	660.634	1	.000	1.009
	CIS	.002	.000	41.603	1	.000	1.002
	Preparatory School	-.175	.085	4.224	1	.040	.839
	Prior Enlisted	.761	.102	55.678	1	.000	2.141
	Summer Seminar Status	-.023	.072	.107	1	.743	.977

Note: Nagelkerke R^2 for step 1 = .003, for step 2 = .287, for step 3 =.297, and for step 4 = .297

D. REGRESSION ANALYSES OF SUMMER SEMINAR PARTICIPATION ON MILITARY PERFORMANCE VARIABLES

1. Military Cumulative Quality Point Rating

Table 17 presents the results of the hierarchical linear regression analysis of Summer Seminar participation on military cumulative quality point ratings. This analysis incorporates several types of control variables to examine the unique effect of Summer Seminar participation on military cumulative quality point ratings. Table 17 displays statistics for each of the independent variables entered on each of the four steps included in the model. Beta weights with standard error, standardized betas, t statistics, and the significance associated with each variable in the model are also displayed. Variables entered on each step are depicted in bold on the respective step.

Results of the hierarchical linear regression analysis were significant $f(12,6578)=130.534$ (p<0.001), indicating that Summer Seminar participation was predictive of higher military cumulative quality point ratings. Although the magnitude of this effect was small (beta=.029), it is worth noting that the impact of the Summer Seminar program on military cumulative quality point ratings was significant even after controlling for demographic and admissions variables, as well as proven indicators of success. The model accounted for 19.1% of the variance in military cumulative quality point ratings (Adjusted R^2=.191).

Additionally, Minority Status, Combined ECA, Official HS Rank, HS Recommendations, SAT Math, SAT Verbal, CIS, and Prior Enlisted significantly predicted military cumulative quality point ratings. These results indicate that midshipmen were more likely to have a higher military cumulative quality point rating if they participated in more high school extracurricular activities, had a higher high school class rank or teacher recommendation scores, had a higher math or verbal SAT score, had a higher career interest score on the modified SCII, or were prior-enlisted. They were more likely to have a lower military cumulative quality point rating if they were a minority.

Table 17.   Regression Results for Military Cumulative Quality Point Rating

Step	Independent Variable	B	Std. Error	beta	t	Sig.
1	(Constant)	3.169	.004		707.768	.000
	Minority Status	-.178	.010	-.213	-17.667	.000
	Gender Status	.019	.011	.021	1.778	.076
2	(Constant)	1.626	.068		23.829	.000
	Minority Status	-.110	.010	-.132	-11.384	.000
	Gender Status	-.014	.010	-.015	-1.315	.189
	Combined ECA	.000	.000	.061	5.278	.000
	Official HS Rank	.001	.000	.250	19.738	.000
	HS Recommendations	.000	.000	.091	7.803	.000
	SAT Math	.001	.000	.111	8.344	.000
	SAT Verbal	.000	.000	.077	5.927	.000
	TIS	-.000	.000	-.001	-.065	.948
	CIS	.000	.000	.039	3.385	.001
3	(Constant)	1.596	.074		21.541	.000
	Minority Status	-.112	.010	-.134	-11.516	.000
	Gender Status	-.012	.010	-.013	-1.163	.245
	Combined ECA	.000	.000	.065	5.579	.000
	Official HS Rank	.001	.000	.255	19.222	.000
	HS Recommendations	.000	.000	.087	7.434	.000
	SAT Math	.001	.000	.114	8.304	.000
	SAT Verbal	.000	.000	.080	6.067	.000
	TIS	.000	.000	.001	.075	.940
	CIS	.000	.000	.038	3.314	.001
	Preparatory School	-.004	.011	-.005	-.363	.716
	Prior Enlisted	.031	.012	.032	2.467	.014
4	(Constant)	1.621	.075		21.687	.000
	Minority Status	-.113	.010	-.136	-11.659	.000
	Gender Status	-.013	.010	-.015	-1.273	.203
	Combined ECA	.000	.000	.064	5.444	.000
	Official HS Rank	.001	.000	.255	19.232	.000
	HS Recommendations	.000	.000	.087	7.389	.000
	SAT Math	.001	.000	.111	8.103	.000
	SAT Verbal	.000	.000	.075	5.614	.000
	TIS	.000	.000	.000	.036	.971
	CIS	.000	.000	.038	3.296	.001
	Preparatory School	-.003	.011	-.005	-.324	.746
	Prior Enlisted	.034	.013	.035	2.713	.007
	Summer Seminar Status	.022	.009	.029	2.490	.013

Note: Adjusted R^2 for step 1 = .042, for step 2 = .190, for step 3 =.191, and for step 4 = .191

2. Striper Selection

Table 18 presents the results of the hierarchical logistic regression analysis of Summer Seminar participation on striper selection. This analysis incorporates several types of control variables to examine the unique effect of Summer Seminar participation on striper selection. Table 18 displays statistics for each of the independent variables entered on each of the four steps included in the model. Beta weights with standard error, Wald coefficients, the degrees of freedom, the significance, and odds ratios associated with each variable in the model are also displayed. Variables entered on each step are depicted in bold on the respective step.

Results of the hierarchical logistic regression analysis were significant $\chi^2(12)=221.548$ (p<0.001). However, examination of the beta weight coefficient suggests that Summer Seminar participation did not predict unique variance beyond that associated with previously included variables. Thus, Summer Seminar participation did not influence striper selection.

Overall, the model accounted for 5.0% of the variance in striper selection (Nagelkerke R^2=.050). Individual variables that significantly predicted striper selection include Minority Status, Combined ECA, Official HS Rank, HS Recommendations, SAT Math and TIS. These results indicate that midshipmen were more likely to be a striper if they participated in more high school extracurricular activities, had a higher high school class rank or teacher recommendation scores, or had a higher math SAT score. They were less likely to be a striper if they were a minority or had a higher technical interest score on the modified SCII.

Table 18. Regression Results for Striper Selection

Step	Independent Variable	B	Std. Error	Wald	df	Sig.	Exp(B)
1	(Constant)	-1.118	.034	1109.759	1	.000	.327
	Minority Status	-.366	.082	20.182	1	.000	.693
	Gender Status	.194	.079	5.953	1	.015	1.214
2	(Constant)	-5.766	.585	97.100	1	.000	.003
	Minority Status	-.202	.086	5.585	1	.018	.817
	Gender Status	.018	.084	.046	1	.830	1.018
	Combined ECA	.003	.000	54.435	1	.000	1.003
	Official HS Rank	.001	.000	16.241	1	.000	1.001
	HS Recommendations	.002	.000	28.058	1	.000	1.002
	SAT Math	.002	.001	7.114	1	.008	1.002
	SAT Verbal	.000	.001	.031	1	.861	1.000
	TIS	-.001	.000	16.909	1	.000	.999
	CIS	.000	.000	.073	1	.787	1.000
3	(Constant)	-5.825	.635	84.154	1	.000	.003
	Minority Status	-.207	.086	5.791	1	.016	.813
	Gender Status	.022	.084	.067	1	.796	1.022
	Combined ECA	.003	.000	55.057	1	.000	1.003
	Official HS Rank	.001	.000	15.537	1	.000	1.001
	HS Recommendations	.002	.000	26.826	1	.000	1.002
	SAT Math	.002	.001	6.928	1	.008	1.002
	SAT Verbal	.000	.001	.050	1	.822	1.000
	TIS	-.001	.000	16.513	1	.000	.999
	CIS	.000	.000	.060	1	.806	1.000
	Preparatory School	-.025	.094	.070	1	.791	.976
	Prior Enlisted	.092	.109	.707	1	.400	1.096
4	(Constant)	-5.694	.641	78.933	1	.000	.003
	Minority Status	-.214	.086	6.217	1	.013	.807
	Gender Status	.015	.084	.032	1	.858	1.015
	Combined ECA	.003	.000	53.834	1	.000	1.003
	Official HS Rank	.001	.000	15.618	1	.000	1.001
	HS Recommendations	.002	.000	26.445	1	.000	1.002
	SAT Math	.002	.001	6.327	1	.012	1.002
	SAT Verbal	.000	.001	.000	1	.989	1.000
	TIS	-.001	.000	16.692	1	.000	.999
	CIS	.000	.000	.052	1	.820	1.000
	Preparatory School	-.022	.094	.056	1	.813	.978
	Prior Enlisted	.109	.110	.984	1	.321	1.115
	Summer Seminar Status	.108	.071	2.338	1	.126	1.114

Note: Nagelkerke R^2 for step 1 = .006, for step 2 = .049, for step 3 =.049, and for step 4 = .050

3.   Honor and Major Conduct Offenses

Table 19 presents the results of the hierarchical logistic regression analysis of Summer Seminar participation on honor and major conduct offenses. This analysis incorporates several types of control variables to examine the unique effect of Summer Seminar participation on honor and major conduct offenses. Table 19 displays statistics for each of the independent variables entered on each of the four steps included in the model. Beta weights with standard error, Wald coefficients, the degrees of freedom, the significance, and odds ratios associated with each variable in the model are also displayed. Variables entered on each step are depicted in bold on the respective step.

Results of the hierarchical logistic regression analysis were significant $\chi^2(12)=120.497$ (p<0.001).   However, examination of the beta weight coefficient suggests that Summer Seminar participation did not predict unique variance beyond that associated with previously included variables. Thus, Summer Seminar participation did not influence honor and major conduct offenses.

Overall, the model accounted for 3.1% of the variance in honor and major conduct offenses (Nagelkerke R^2=.031). Individual variables that significantly predicted honor and major conduct offenses include Official HS Rank, HS Recommendations, SAT Verbal, and CIS. These results indicate that midshipmen were less likely to have an honor or major conduct offense in their record if they had a higher high school class rank or teacher recommendation scores, had a higher verbal SAT score, or had a higher career interest score on the modified SCII.

Table 19.   Regression Results for Honor and Major Conduct Offenses

Step	Independent Variable	B	Std. Error	Wald	df	Sig.	Exp(B)
1	(Constant)	-1.063	.036	876.074	1	.000	.345
	Minority Status	.212	.077	7.572	1	.006	1.237
	Gender Status	-.147	.087	2.822	1	.093	.863
2	(Constant)	1.909	.588	10.545	1	.001	6.747
	Minority Status	.119	.081	2.140	1	.144	1.126
	Gender Status	-.078	.092	.716	1	.397	.925
	Combined ECA	.000	.000	1.004	1	.316	1.000
	Official HS Rank	-.002	.000	46.078	1	.000	.998
	HS Recommendations	-.001	.000	10.361	1	.001	.999
	SAT Math	.001	.001	1.422	1	.233	1.001
	SAT Verbal	-.001	.001	3.009	1	.083	.999
	TIS	.000	.000	1.920	1	.166	1.000
	CIS	-.001	.000	12.927	1	.000	.999
3	(Constant)	2.105	.640	10.808	1	.001	8.204
	Minority Status	.125	.081	2.371	1	.124	1.134
	Gender Status	-.085	.092	.858	1	.354	.918
	Combined ECA	.000	.000	.688	1	.407	1.000
	Official HS Rank	-.002	.000	45.609	1	.000	.998
	HS Recommendations	-.001	.000	9.153	1	.002	.999
	SAT Math	.001	.001	.929	1	.335	1.001
	SAT Verbal	-.001	.001	3.414	1	.065	.999
	TIS	-.001	.000	2.140	1	.144	.999
	CIS	-.001	.000	12.661	1	.000	.999
	Preparatory School	-.021	.090	.053	1	.817	.979
	Prior Enlisted	-.122	.111	1.217	1	.270	.885
4	(Constant)	2.216	.647	11.741	1	.001	9.168
	Minority Status	.119	.082	2.121	1	.145	1.126
	Gender Status	-.090	.092	.962	1	.327	.914
	Combined ECA	.000	.000	.574	1	.449	1.000
	Official HS Rank	-.002	.000	45.826	1	.000	.998
	HS Recommendations	-.001	.000	9.235	1	.002	.999
	SAT Math	.001	.001	.770	1	.380	1.001
	SAT Verbal	-.001	.001	4.066	1	.044	.999
	TIS	-.001	.000	2.197	1	.138	.999
	CIS	-.001	.000	12.808	1	.000	.999
	Preparatory School	-.018	.090	.042	1	.838	.982
	Prior Enlisted	-.108	.111	.942	1	.332	.898
	Summer Seminar Status	.094	.074	1.582	1	.208	1.098

Note: Nagelkerke R^2 for step 1 = .003, for step 2 = .030, for step 3 =.031, and for step 4 = .031

E. REGRESSION ANALYSIS OF SUMMER SEMINAR PARTICIPATION ON PHYSICAL READINESS TEST SCORES

Table 20 presents the results of the hierarchical linear regression analysis of Summer Seminar participation on physical readiness test scores. This analysis incorporates several types of control variables to examine the unique effect of Summer Seminar participation on physical readiness test scores. Table 20 displays statistics for each of the independent variables entered on each of the four steps included in the model. Beta weights with standard error, standardized betas, t statistics, and the significance associated with each variable in the model are also displayed. Variables entered on each step are depicted in bold on the respective step.

Results of the hierarchical linear regression analysis were significant $f(12,4606)=13.456$ (p<0.001), indicating that Summer Seminar participation was predictive of higher physical readiness test scores. Although the magnitude of this effect was small (beta=.048), it is worth noting that the impact of the Summer Seminar program on physical readiness test scores was significant even after controlling for demographic and admissions variables, as well as proven indicators of success. The model accounted for 3.1% of the variance in a midshipman's physical readiness test scores (Adjusted R^2=.031).

Additionally, Minority Status, Gender Status, Combined ECA, Official HS Rank, SAT Verbal, CIS, and Prior Enlisted significantly predicted physical readiness test scores. These results indicate that midshipmen were more likely to score higher on their physical readiness test if they participated in more high school extracurricular activities or had a higher high school class rank. They were likely to score lower on their physical readiness test if they were a minority, a female, had a higher verbal SAT score, had a higher career interest score on the modified SCII, or were prior-enlisted.

Table 20.   Regression Results for Physical Readiness Test Scores

Step	Independent Variable	B	Std. Error	beta	t	Sig.
1	(Constant)	83.928	.150		559.570	.000
	Minority Status	-1.011	.336	-.044	-3.014	.003
	Gender Status	-.431	.359	-.018	-1.201	.230
2	(Constant)	80.738	2.403		33.596	.000
	Minority Status	-.872	.345	-.038	-2.526	.012
	Gender Status	-.896	.368	-.037	-2.436	.015
	Combined ECA	.012	.002	.101	6.631	.000
	Official HS Rank	.008	.001	.092	5.536	.000
	HS Recommendations	.000	.001	.003	.193	.847
	SAT Math	.002	.002	.013	.748	.454
	SAT Verbal	-.010	.002	-.072	-4.193	.000
	TIS	.000	.001	-.004	-.281	.778
	CIS	-.006	.001	-.072	-4.795	.000
3	(Constant)	81.645	2.628		31.073	.000
	Minority Status	-.833	.345	-.037	-2.411	.016
	Gender Status	-.969	.368	-.040	-2.632	.009
	Combined ECA	.011	.002	.092	6.000	.000
	Official HS Rank	.007	.001	.084	4.854	.000
	HS Recommendations	.001	.001	.010	.657	.511
	SAT Math	.002	.003	.011	.602	.547
	SAT Verbal	-.010	.002	-.074	-4.268	.000
	TIS	-.001	.001	-.008	-.528	.597
	CIS	-.006	.001	-.069	-4.618	.000
	Preparatory School	.251	.380	.012	.662	.508
	Prior Enlisted	-1.806	.501	-.057	-3.607	.000
4	(Constant)	82.735	2.648		31.246	.000
	Minority Status	-.892	.345	-.039	-2.581	.010
	Gender Status	-1.032	.369	-.042	-2.799	.005
	Combined ECA	.011	.002	.089	5.796	.000
	Official HS Rank	.007	.001	.083	4.789	.000
	HS Recommendations	.001	.001	.010	.652	.514
	SAT Math	.001	.003	.007	.409	.682
	SAT Verbal	-.011	.002	-.082	-4.694	.000
	TIS	-.001	.001	-.009	-.554	.580
	CIS	-.006	.001	-.070	-4.685	.000
	Preparatory School	.283	.379	.013	.747	.455
	Prior Enlisted	-1.657	.503	-.052	-3.296	.001
	Summer Seminar Status	.922	.294	.048	3.138	.002

Note: Adjusted R^2 for step 1 = .002, for step 2 = .027, for step 3 =.030, and for step 4 = .031

F.   SUMMARY

This chapter covered the results from the correlation and regression analyses performed in this study. First, a correlation matrix showed the first-order, bivariate correlations between eighteen of the nineteen variables, both independent and dependent. Then, the results of the seven regressions performed in this study were presented. Conclusions from these results will be drawn in Chapter V.

A summary of significant independent variables from the regressions is presented in Table 21. The dependent variables are listed on the left, along with the total percentage of variance predicted by the model for each. This percentage is derived from either the Nagelkerke R^2 or the Adjusted R^2, depending on the type of regression performed. The independent variables, both with positive and negative correlation, are listed on the right in order by the magnitude of their correlation. Either the Wald or beta statistic follows each independent variable, depending on the type of regression performed.

Table 21.   Summary of Significant Independent Variables

DEPENDENT VARIABLE	INDEPENDENT VARIABLES WITH POSITIVE CORRELATION	INDEPENDENT VARIABLES WITH NEGATIVE CORRELATION
Graduated 3.1%	Preparatory School (z=15.569) Official HS Rank (z=14.712) Summer Seminar Status (z=10.709) HS Recommendations (z=10.143) SAT Math (z=8.355) Combined ECA (z=4.660)*	Gender Status (z=57.340) Minority Status (z=19.526)
Academic CQPR 34.2%	Official HS Rank (beta=.335) SAT Math (beta=.262) SAT Verbal (beta=.105) Prior Enlisted (beta=.042) HS Recommendations (beta=.038) CIS (beta=.034) Summer Seminar Status (beta=.033)	Minority Status (beta=-.090) TIS (beta=-.054) Combined ECA (beta=-.041) Gender Status (beta=-.028) Preparatory School (beta=-.028)*
Technical Major 29.7%	TIS (z=660.634) SAT Math (z=248.279) Prior Enlisted (z=55.678) Official HS Rank (z=47.055) CIS (z=41.603) Gender Status (z=19.037) Minority Status (z=5.380)*	SAT Verbal (z=21.867) Preparatory School (z=4.224)*
Military CQPR 19.1%	Official HS Rank (beta=.255) SAT Math (beta=.111) HS Recommendations (beta=.087) SAT Verbal (beta=.075) Combined ECA (beta=.064) CIS (beta=.038) Prior Enlisted (beta=.035) Summer Seminar Status (beta=.029)*	Minority Status (beta=-.136)
Striper 5.0%	Combined ECA (z=53.834) HS Recommendations (z=26.445) Official HS Rank (z=15.618) SAT Math (z=6.327)*	TIS (z=16.692) Minority Status (z=6.217)*
Honor/Major Conduct Offenses 3.1%		Official HS Rank (z=45.826) CIS (z=12.808) HS Recommendations (z=9.235) SAT Verbal (z=4.066)*
Mean PRT 3.1%	Combined ECA (beta=.089) Official HS Rank (beta=.083) Summer Seminar Status (beta=.048)	SAT Verbal (beta=-.082) CIS (beta=-.070) Prior Enlisted (beta=-.052) Gender Status (beta=-.042) Minority Status (beta=-.039)

*Denotes p‹0.05 for these independent variables. p‹0.01 for all others.

V.   CONCLUSIONS AND RECOMMENDATIONS

A.   INTRODUCTION

This chapter will use the analyses of Chapter IV and draw conclusions based the previous literature reviewed in Chapter II. As a review, it was hypothesized that Summer Seminar attendance would lead to increased graduation rates and academic cumulative quality point ratings, as well as increased military and physical performance. To begin with, the results from the correlation and regression analyses will be interpreted in light of previous literature. Finally, a summary of conclusions and recommendations for further study will be presented.

When examining the dependent variables, a review of the significant results from the correlation matrix in Table 13 reveals that Summer Seminar participants were likely to have higher academic cumulative quality point ratings, higher military cumulative quality point ratings, a greater chance of being a striper, and higher scores on the physical readiness test. While these are only first-order correlations between two variables, they are a starting point for further conclusions. The fact that orientation programs such as the Summer Seminar program yield increased academic performance is well established in the literature (Banta & Kuh, 1998; Galloway, 2000; Gass, 1987). This is reflected in the positive correlation between Summer Seminar participation and academic cumulative quality point ratings.   Also, the positive correlations between Summer Seminar participation and military cumulative quality point ratings, being a striper, and physical readiness test scores may be indicative of the increase in the performance of participants of a realistic job preview such as the Summer Seminar program (Phillips, 1998). Further conclusions, based on hierarchical regression analyses, will be drawn later in this chapter.

While not directly related to the hypotheses in this study, it is interesting to note the correlation of Summer Seminar participation with the other independent variables. Summer Seminar participation is correlated negatively with preparatory school attendance and prior-enlisted service. A review of the data indicates that only 9% of Summer Seminar participants later attended preparatory school and only 1% later went on to enlisted service (Table 2), as compared to the overall averages of 21.7% and 12.5%,

respectively (Table 9). The admissions path to the Naval Academy does not normally lead people who have attended the Summer Seminar program down either of these paths, so it is logical that they are under-represented when looking at Summer Seminar program participants.

Also of note is the positive correlation between Summer Seminar participation and being a female. When looking at this data set, the fact stands out that 21% of Summer Seminar participants were female (Table 2), a high percentage when compared to the overall average of 16.2% (Table 9). There is no mechanism in place to accept a greater percentage of females than normal to the Summer Seminar program, but it appears to be occurring none-the-less.

Finally, the positive correlation between Summer Seminar participation and more high school extracurricular activities, better high school class ranks and teacher recommendation scores, and higher math and verbal SAT scores is indicative of the fact that Summer Seminar participants were above average on all of these scores (Table 2 & Table 11). This may result from the fact that the participants in the Summer Seminar program are highly screened before they are allowed to participate (United States Naval Academy, 2003c).

B. CONCLUSIONS ON ANALYSES OF ACADEMIC PERFORMANCE VARIABLES

1. Graduation Rate

It was hypothesized that graduation rates would be positively affected by Summer Seminar attendance. The studies on orientation programs (Banta & Kuh, 1998; Galloway, 2000; Gass, 1987, 1990; Schaeffer, 1999), as well as realistic job previews and expectation-lowering procedures (Buckley et al., 2002; Phillips, 1998), all indicated that a program such as Summer Seminar should have a positive effect on graduation rates. The hypothesis was confirmed by the analysis done in this study. The results of the hierarchical logistic regression analysis indicated that program participants were 1.26 times more likely to graduate than non-participants, and these results were significant at the 0.01 level (Table 14). This may indicate that Summer Seminar participants, when compared to non-participants, apply to the Naval Academy with a better understanding of what Naval Academy life entails. This information may make them more likely to

complete the four years necessary to graduate. Also, the pre-exposure may deter some Summer Seminar participants from applying for admission as they realize that the Naval Academy is not for them, an opportunity that non-participants miss since they do not receive the same pre-exposure. Candidates without this pre-exposure may be at a greater risk to attrite early in their Naval Academy career as they come to realize that they are unhappy with their choice of colleges.

2. Academic Cumulative Quality Point Rating

It was hypothesized that academic cumulative quality point ratings would be positively affected by Summer Seminar attendance. Previous research on orientation programs (Banta & Kuh, 1998; Galloway, 2000; Gass, 1987) indicated that programs similar to Summer Seminar yielded increased academic performance, and the first-order, bivariate correlation between Summer Seminar participation and academic cumulative quality point ratings indicated a positive relationship. The hypothesis was confirmed by the analysis done in this study. The results of the hierarchical linear regression analysis indicated that Summer Seminar program participation was indicative of higher academic cumulative quality point ratings, and these results were significant at the 0.01 level (Table 15). This increased academic success may result from the fact that Summer Seminar participants arrive at the Naval Academy better oriented than non-participants, making them more ready to perform academically. Also, the fact that Summer Seminar participants are highly screened (United States Naval Academy, 2003c) may predispose them to a better academic performance than non-participants, although Summer Seminar participation was significantly indicative of higher academic cumulative quality point ratings even after controlling for the admissions variables used to screen Summer Seminar applicants.

3. Major Selection

The hypothesis for this study stated that it was unknown what effect, if any, that Summer Seminar attendance would have on major selection. There was no existing literature in this area, and the initial first-order, bivariate correlation did not yield any significant results. The results of the hierarchical logistic regression analysis indicated that Summer Seminar program participation was not a significant indicator that a midshipman would choose a technical major. During the Summer Seminar curriculum,

participants are exposed to a variety of Naval Academy majors, both technical and non-technical (United States Naval Academy, 2003a). Since the Summer Seminar program does not have a bias towards presenting information on only technical majors, it follows that Summer Seminar participation would not be indicative of a midshipman selecting a technical major.

C.   CONCLUSIONS ON ANALYSES OF MILITARY PERFORMANCE VARIABLES

1.   Military Cumulative Quality Point Rating

It was hypothesized that military cumulative quality point ratings would be positively affected by Summer Seminar attendance. Previous literature on realistic job previews (Phillips, 1998) indicated that programs similar to Summer Seminar yielded increased performance, and the first-order, bivariate correlation between Summer Seminar participation and military cumulative quality point ratings indicated a positive relationship. The hypothesis was confirmed by the analysis done in this study. The results of the hierarchical linear regression analysis indicated that Summer Seminar program participation was indicative of higher military cumulative quality point ratings, and these results were significant at the 0.05 level (Table 17). This increased military success may result from the fact that Summer Seminar participants have a better understanding of the military lifestyle that four years at the Naval Academy entails (United States Naval Academy, 2003b). They are able to decide before applying to the Naval Academy if this lifestyle would suit them. Those that do apply and are accepted have already committed themselves to a military existence, and this mindset may account for their increased military performance over midshipmen who did not attend the Summer Seminar program and whose military performance may be suffering because they are not militarily inclined.

2.   Striper Selection

It was hypothesized that striper selection would be positively affected by Summer Seminar attendance. Previous literature on realistic job previews (Phillips, 1998) indicated that programs similar to Summer Seminar yielded increased performance, and the first-order, bivariate correlation between Summer Seminar participation and striper selection indicated a positive relationship. However, the hypothesis was not confirmed by the analysis done in this study. The results of the hierarchical logistic regression

analysis indicated that Summer Seminar program participation was not a significant indicator of increased striper selection. This is inconsistent with the literature, and may be explained in one of two ways. Either a midshipman's selection as a striper is not a good indicator of performance at the Naval Academy or the dependent variable needs to be structured differently. The first possibility seems unlikely, as the selection to a striper position is a large part of the military development of midshipmen (Bogle, 1996). This indicates that the structure of the dependent variable Striper may be flawed. In this study it was coded dichotomously, indicating that a midshipman either held a striper position or they did not. A restructuring of the dependent variable to distinguish between the different ranks of striper billets and the number of striper billets held by an individual may yield results that are more in line with the literature.

3.   Honor and Major Conduct Offenses

It was hypothesized that Summer Seminar attendance would be positively associated with a lack of honor and major conduct offenses. Previous literature on realistic job previews (Phillips, 1998) indicated that programs similar to Summer Seminar yielded increased performance. However, the hypothesis was not confirmed by the analysis done in this study. The results of the hierarchical logistic regression analysis indicated that Summer Seminar program participation was not a significant indicator of a lack of honor and major conduct offenses. While this is inconsistent with the general performance literature, there is no reason to doubt the results of the analysis. Committing an honor or major conduct offense is clearly a sign of negative performance at the Naval Academy (Locklear, 2000a; Ryan, 2001). There is not prior research that specifically ties honor and conduct behavior to a realistic job preview similar to the Summer Seminar program. It is concluded that there are factors other than Summer Seminar attendance that may be significantly related to committing an honor or major conduct offense. It is interesting to note that the model used in this study did not contain a single positive significant indicator of committing an honor or major conduct offense, although it did have four negative significant indicators. Apparently it is easier to identify who will not commit an honor or major conduct violation than it is to identify who will.

D. CONCLUSIONS ON ANALYSIS OF PHYSICAL READINESS TEST SCORES

It was hypothesized that Summer Seminar attendance would be related to higher physical readiness test scores. Previous literature on realistic job previews (Phillips, 1998) indicated that programs similar to Summer Seminar yielded increased performance, and the first-order, bivariate correlation between Summer Seminar participation and physical readiness test scores indicated a positive relationship. The hypothesis was confirmed by the analysis done in this study. The results of the hierarchical linear regression analysis indicated that Summer Seminar program participation was indicative of higher physical readiness test scores, and these results were significant at the 0.01 level (Table 20). This increased physical success may result from the fact that Summer Seminar participants have a better understanding of the physical hardships that await them at the Naval Academy. The Summer Seminar program includes physical training sessions (United States Naval Academy, 2003b), and in recent years participants have been administered the same physical readiness test that midshipmen are subject to (Nelson, personal communication, January 2004). Summer Seminar participants may use the year following their pre-exposure to increase their physical performance before attending the Naval Academy. Also, some attendees may realize that they do not posses the necessary physical skills, or the desire to develop them, and not apply for admission to the Naval Academy. These are both options that are lost to midshipmen whom did not attend the Summer Seminar program.

E. SUMMARY AND RECOMMENDATIONS

In summary, this study looked at the impact of Summer Seminar participation on the success of midshipmen at the Naval Academy. The body of literature on recruiting and orientation programs, as well as realistic job previews and expectation-lowering procedures, was reviewed. Indicators of midshipman success at the Naval Academy were defined by reviewing appropriate instructions and past studies of midshipman success. Finally, these success indicators were analyzed using hierarchical regression analyses to determine which were affected by Summer Seminar participation.

A midshipman's academic, military, and physical performance were all positively affected by Summer Seminar attendance. Academically, midshipmen who participated in

the Summer Seminar program had better graduation rates and higher academic cumulative quality point ratings than non-participants. Militarily, the Summer Seminar midshipmen had higher military cumulative quality point ratings than their counterparts who did not attend the Summer Seminar program. Physically, Summer Seminar attendees had higher physical readiness test scores than non-attendees.

The results of this study are important in that they confirm previous findings on the impact of recruiting and orientation programs, realistic job previews, and expectation-lowering procedures on academic performance and retention (Banta & Kuh, 1998; Buckley et al., 2002; Galloway, 2000; Gass, 1987, 1990; Phillips, 1998; Schaeffer, 1999). This study is unique in that it expands on previous research by demonstrating the positive relationship between the Summer Seminar program and both military and physical indicators of midshipman success. Previous studies (Phillips, 1998) alluded to the positive impact of realistic job previews on performance in general, but no previous literature had specifically looked at the military and physical aspects of performance that were included in this study. It is important to note that the results on academic, military, and physical performance in this study were observed after controlling for demographic and admissions variables, as well as proven indicators of midshipman success.

This study has important implications for the Naval Academy and the Navy, as well as for the other service academies. For the Naval Academy to host a large program such as Summer Seminar utilizes a vast amount of resources. These resources range from the physical space in Bancroft Hall and the time of the midshipmen who run the program to the money spent to administer the program, and have no doubt increased as the program has significantly increased in size over the past decade (Nelson, 2003). It appears as if the resources have been put to good use, especially in light of the fact that Summer Seminar participants in this study showed significantly better academic, military, and physical performance than non-participants.

For the Navy, the fact that Summer Seminar participants are 1.26 times more likely to graduate than non-participants is of interest. The throughput of the Naval Academy is based on the personnel needs of the Navy. Every time a midshipman fails to graduate, the Navy must compensate by training another body to fill the hole. The Navy

thus loses the initial time and dollar investment made in the non-graduate. Depending on how far along the failing midshipman was, this investment can be upwards of four years and hundreds of thousands of dollars. Clearly, any program that can minimize this loss is of benefit to the Navy.

For the other service academies, this research may serve as a beginning point for research into their own similar summer programs. The United States Military Academy (USMA), the United States Air Force Academy (USAFA), and the United States Coast Guard Academy (USCGA) all have programs like Summer Seminar. For USMA it is the Invitational Academic Workshop, for USAFA it is also called Summer Seminar, and for USCGA it is the Academy Introduction Mission. All three of these programs are similar in scope to the Naval Academy's Summer Seminar, but they currently accommodate less than half the number of participants that the Naval Academy's Summer Seminar program does. It may be worthwhile to the other service academies to evaluate their programs, possibly using a similar method as this study, and determine if they could benefit from increasing the size of their summer programs.

As stated in Chapter I, it was not the intent of this study to judge the Summer Seminar program as a whole. Rather, this review of the Summer Seminar program was based only on the seven aspects of midshipman performance defined in Chapter III. It is recognized that these seven variables are by no means the official definition of midshipman performance. The possibility is also recognized that the Summer Seminar program has value to individuals other than the participants.

Based on these realizations, this study proposes three recommendations for further research. One recommendation is to determine different variables that better define success at the Naval Academy. While the seven variables used in this study are a starting point, there are many aspects of a midshipman's performance that they do not capture. Using these seven variables as the basis for future expansion in the definition of a midshipman's performance can only lead to a more complete model of success that better captures a midshipman's academic, military, and physical potential.

The variable Striper, as defined in this study, should be broken from a dichotomous variable into one with different categories to recognize the difference in

rank of the various striper billets. As well, the number of striper billets held should be taken into consideration. These two changes would make this variable a more useful one.

Another recommendation for further study is to look at different ways that the Summer Seminar program is of value to the Naval Academy. As shown in this study, it clearly has a value to the attendees. In addition, it may be hypothesized that the program is of equal or greater value to the midshipmen who administer it. The position of Summer Seminar detailer provides an outstanding leadership opportunity for Third and First Class Midshipmen. It is not unusual for a midshipman who is slated to be in a leadership role during the coming fall academic semester to gain some experience and practice by being a Summer Seminar detailer the summer before (Nelson, personal communication, January 2004). The benefit to these midshipmen is surely worthy of study.

A final recommendation for further study is to consider more proximal goals when determining which success factors to consider. Almost exclusively, this study used variables that measured success at the end of a midshipman's four years at the Naval Academy. It would be interesting to consider a midshipman's performance during Plebe year, or even during Plebe summer, and see if there was any relationship to Summer Seminar attendance. Conversely, it would be useful to look at the relationship between Summer Seminar attendance and long-term fleet retention. The literature does point to the long-term benefits of orientation programs such as Summer Seminar (Gass et al., 2003). Taking a more short-term or long-term view of performance measures may yield new, unique benefits of the Summer Seminar program.

Based on the results obtained in this study, it is concluded that the Summer Seminar program makes a unique, positive contribution to the success of a midshipman at the Naval Academy. It is hoped that this study will serve as a starting point for future evaluation of the Summer Seminar program and other programs like it, as well as pioneer the way for future literature on the impact of programs such as Summer Seminar on military and physical performance.

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APPENDIX A

EAS – Aerospace Engineering

EASA – Aerospace Engineering Astronautics

EEE – Electrical Engineering

EGE – General Engineering

EME – Mechanical Engineering

ENA – Naval Architecture

EOE – Ocean Engineering

ESE – Systems Engineering

ESP – Marine Engineering

SAS – Applied Science

SCH – Chemistry

SCS – Computer Science

SGS – General Science

SMA – Mathematics

SMAA – Mathematics Specialty

SMAC – Mathematics Specialty 2

SMAH – Mathematics Honors

SOC – Oceanography

SOCH – Oceanography Honors

SPH – Physics

SPS – Physical Science

SQE – Quantitative Economics

FEC – Economics

FECH – Economics Honors

FPS – Political Science

FPSH – Political Science Honors

HEG – English

HEGH – English Honors

HHS – History

HHSH – History Honors

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